JANUARY, 1953

BUTANE-PROPANE News

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tie to...

ANCHOR

. . . in this new year, and for the years ahead. Anchor offers more LP Gas, increased facilities, and service that is unexcelled.

Tie to Anchor, now offering more plants and delivering more Anchorgas than ever before. And the Anchor fleet of tank cars has been substantially increased to assure you of fast deliveries.

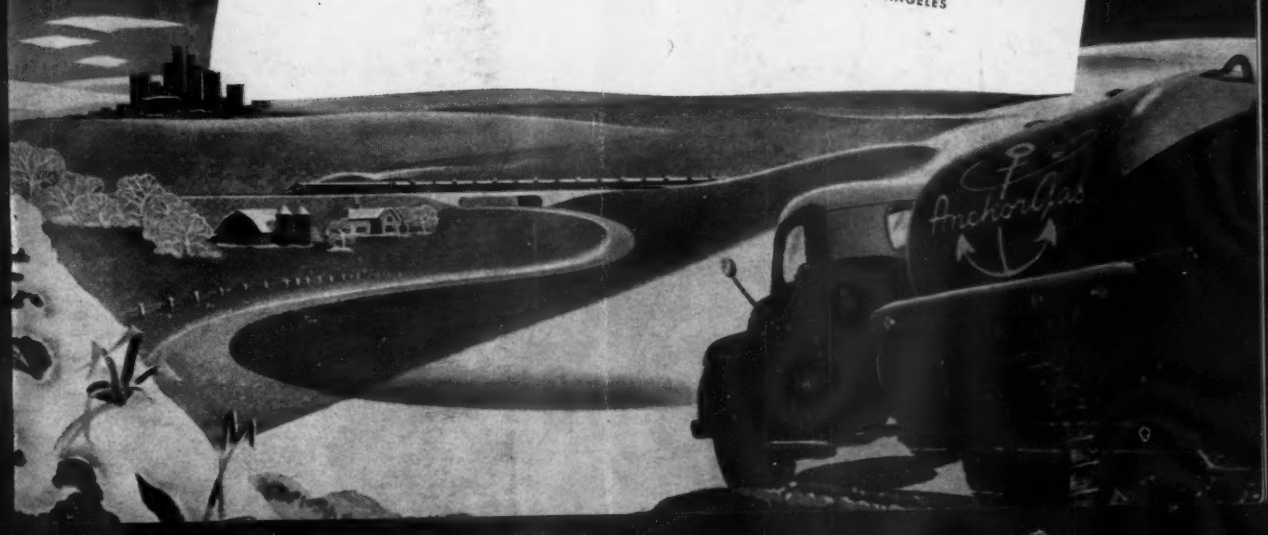
Tie to Anchor, a progressive oil company which takes a personal interest in you and your problems.

Tie to Anchor where LP Gas is not a sideline. Let's talk contracts early in '53.

ANCHOR PETROLEUM COMPANY

SALES OFFICES: DES MOINES • OMAHA • TOLEDO • HOUSTON • LOS ANGELES

TULSA



a profitable perspective

Look to Hackney quality for the *extra values* that save you time, trouble and money every time you handle one of your Hackney LP-Gas Cylinders.

in any size

Look to the complete Hackney line for LP-Gas Cylinders to meet your every need. Capacities from 1 pound to 420 pounds (Propane). Furnished with removable valve protection cap, permanently installed collar or removable hood.

TYPICAL MODELS ILLUSTRATED ABOVE INCLUDE:

MODEL PC-20A—20-lb. domestic cylinder.
MODEL RC-60A—for 60 lbs. Propane or 72 lbs. Butane.
MODEL RC-100A—for 100 lbs. Propane or 119 lbs. Butane.
MODEL RH-300A—for 300 lbs. Propane or 357 lbs. Butane.
MODEL PC-420A—for 420 lbs. Propane or 500 lbs. Butane.

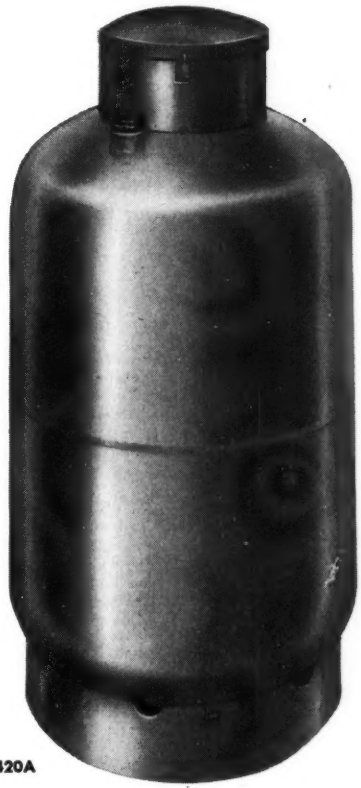
Write today for complete specifications.

Hackney
MILWAUKEE

containers for gases, liquids and solids

STACK

on VALUE



PC-420A

LOW TARE WEIGHT—**saves shipping and distributing costs.**

ENDURING STRENGTH—**for years of economical service.**

ATTRACTIVE APPEARANCE—**to please your customers' good taste.**

DEPTH-CONTROLLED STAMPING—**accurate and easy to read.**

TWO-PIECE CONSTRUCTION—**eliminates head and longitudinal seams.**

HEAVY-DUTY FOOT RING—**easily inspected, properly vented.**

UNIFORMITY—**in size, weight and capacity.**

BOTTOM HEADS PROTECTED—**with special service-tested undercoating for lower maintenance costs.**

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Manufacturer of Hackney Cylinders

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18 W. 43rd St., Room 13, Kansas City 11, Mo.

Hackney
MILWAUKEE

BUTANE-PROPANE News

VOLUME 15 • NUMBER 1

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Branch Offices

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Raymond M. Schuster, District Mgr.
Peter Wile, Asst. District Mgr.
Phone CH 4-1969

Chicago (1)—333 N. Michigan Ave.
Wm. O. Dannhausen, District Mgr.
Phone FRanklin 2-4615

Cleveland (15)—1836 Euclid Ave.
Frank J. Enright, District Mgr.
Phone Prospect 1-4584

Tulsa—P. O. Box 4055
Craig Espy, District Mgr.
2441 E. 25th Pl.—Phone 7-9807

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Lynn C. Denny, Executive Editor
Carl Abell, Editor
Lester L. Luxon, Technical Editor
Lorraine McCann, Editorial Assistant
O. D. Hall, Mid-Continent Editor
Raymond A. Grote, Art Editor

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Jay Jenkins, President and Publisher
Paul Lady, General Manager
D. Newlon, Advertising Manager
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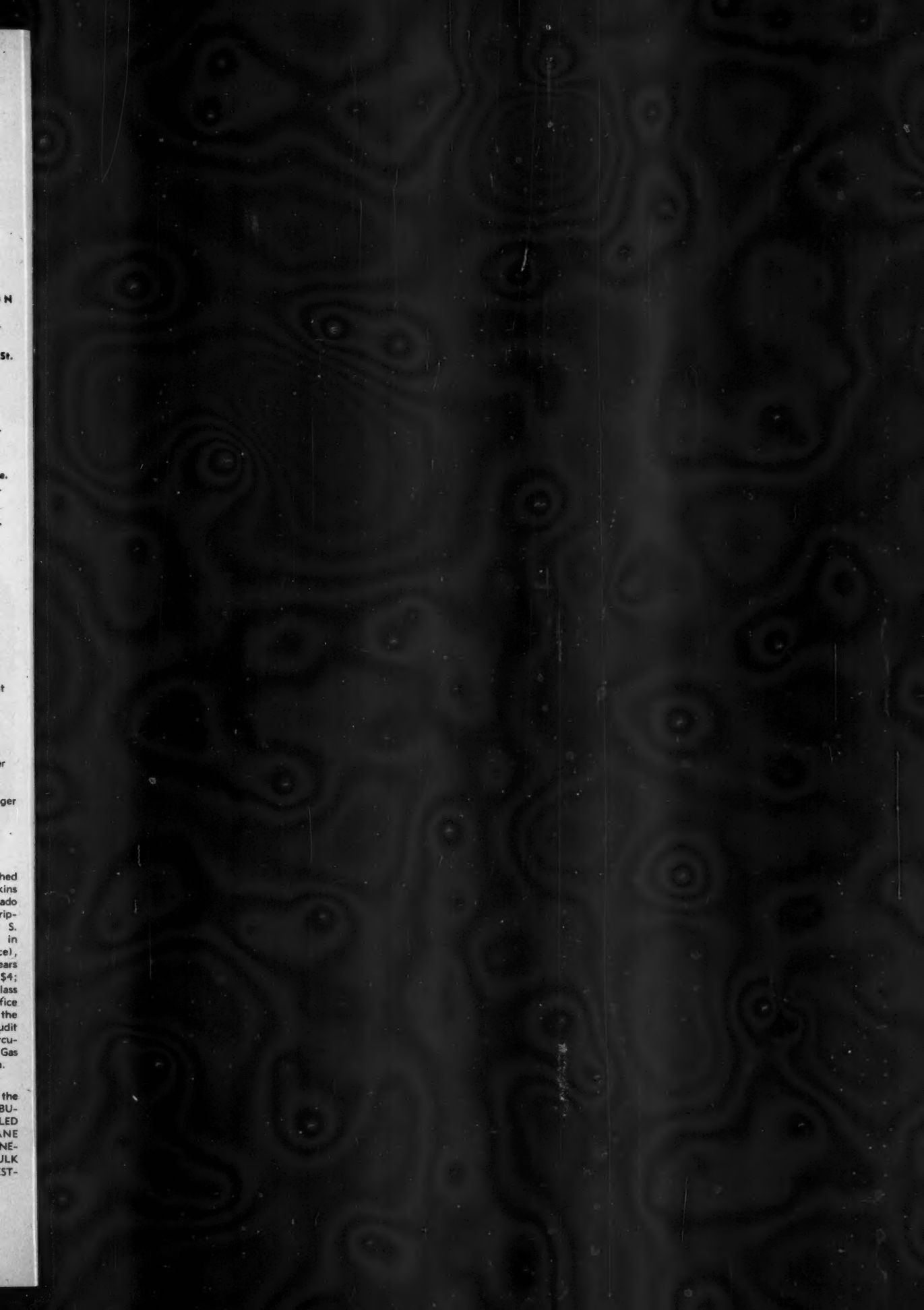

TRANSPORTATION
is important

That's why Warren has invested many millions of dollars in its own tank cars, barges and tank ship.

And, that's why Warren's customers stay with Warren, year after year . . . they know those transportation facilities are available to deliver Warren-T-Gas where it is needed . . . . when it is needed. Why not join them?

WARREN-T-GAS
A LIQUEFIED PETROLEUM GAS OF HIGHEST QUALITY

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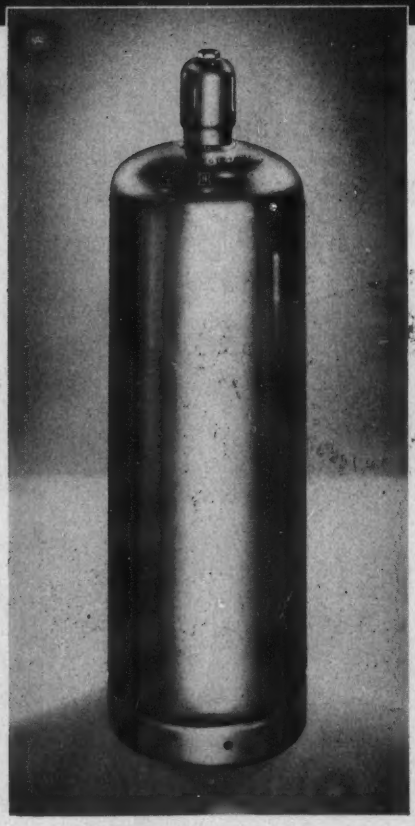
WARREN PETROLEUM CORPORATION • TULSA, OKLAHOMA

The finest LITE-WEIGHT America has ever produced

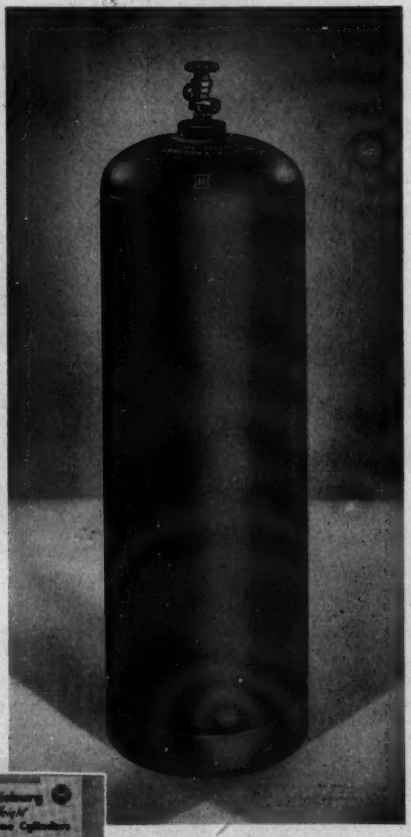


HARRISBURG Lite-Weight Cylinders give you **maximum** safety and quality with **minimum** practical tare weight. They are built to a standard, not to a price. Supplied with or without caps . . . with or without valves inserted . . . your choice of aluminum or red oxide ground coats . . . your registered mark and serial numbers stamped without charge . . . in Domestic and Export types.

Harrisburg Lite-Weight Cylinder with aluminum ground coat.

MEMBER national LP-GAS PROMOTIONAL program

Harrisburg Lite-Weight Cylinder with red oxide ground coat.



SPECIFICATIONS

Capacity: Propane, 100 lbs.—Butane, 121.4 lbs. —Water, 239 lbs. (28.7 gals.).

Nominal Dimensions: Diameter (I.D.) 14½ inches —Height 44-7/8 inches.

Working Pressure: 240 lbs. per square inch.

Construction: High tensile strength alloy steel— Tare weight, 72 lbs.—I.C.C. 4BA-240.

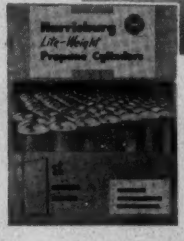
Approximate Units per Carload: 500 to 550.

HLW52-5

100 Years in Pennsylvania's Capital

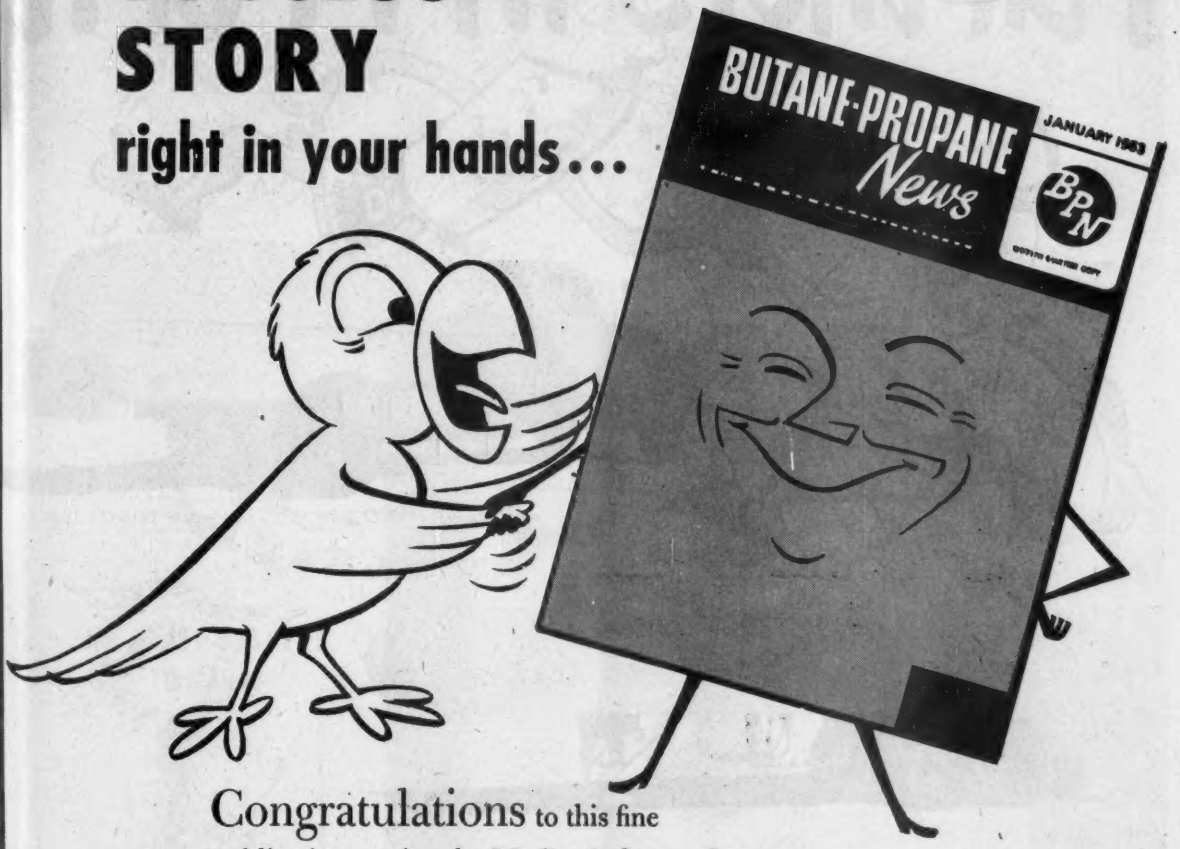
Harrisburg Steel

CORPORATION HARRISBURG 4 PENNSYLVANIA



Write for Bulletin 466 on Harrisburg Lite-Weight Cylinders. Prices on any quantity supplied promptly on request.

You have a SUCCESS STORY right in your hands...



Congratulations to this fine publication serving the LP-Gas Industry. Success and resultant expansion is derived from the confidence of those served. Confidence goes hand-in-hand with "dependability"...a great factor in the growth of BUTANE-PROPANE NEWS...and an essential reason why CALOR is the West's leading independent marketer of LP-Gas. It pays to deal where success is built on dependable service.

For a more complete service all ways—always call CALOR

Calor

CALOR GAS COMPANY

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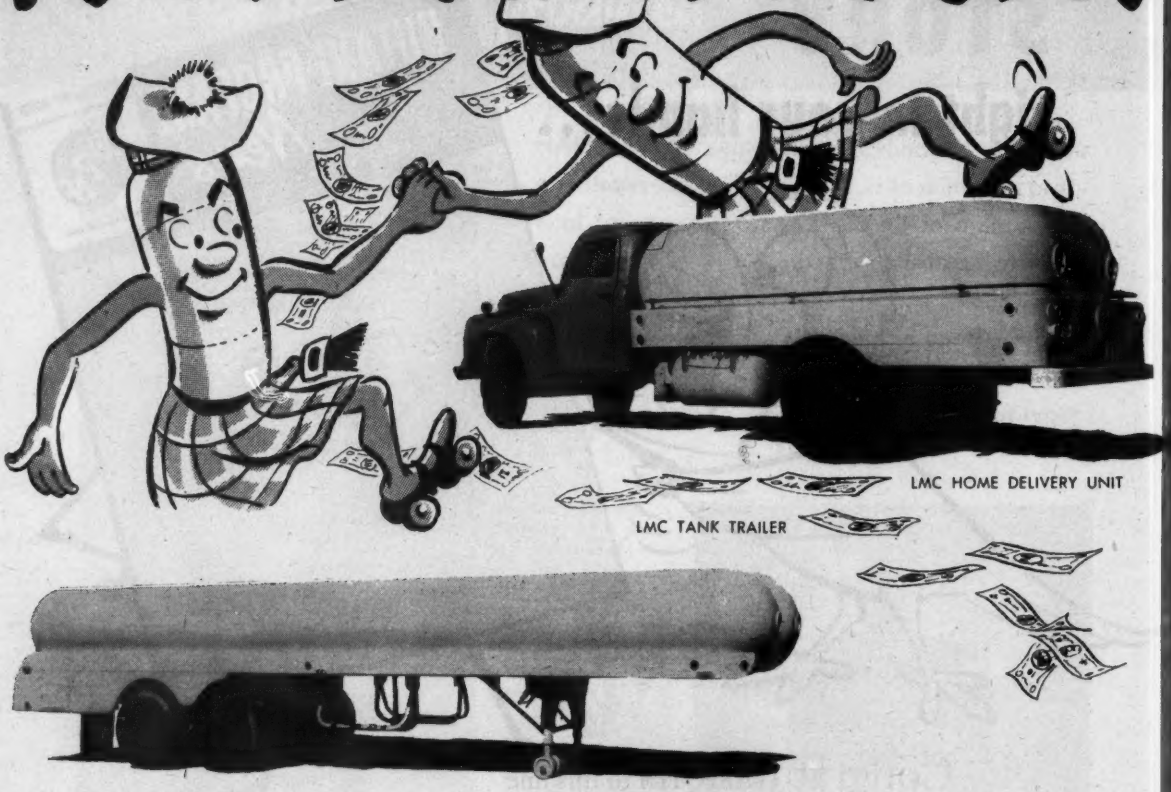
Telephone YUKON 2-3360

Serving Western America

Partners in Profit



LMC HOME DELIVERY UNIT AND TANK TRAILER

When you team up with the LMC Tank Trailer and LMC Home Delivery Unit, you're sure of Low Mileage Cost on both long hauls and customer delivery. The LMC Tank Trailer, in capacities from 3000 to 6000 gallons, points the way to greater profits on long hauls. The sleek, streamlined LMC Home Delivery Unit with the exclusive LMC chrome hand-rail creates customer confidence.

High tensile steel, indented fittings, light weight, low center of gravity and large capacity pumps assure you of Low Mileage Cost from all LMC Transport Tanks.

Buy on the LMC budget plan!

WRITE FOR ADDITIONAL INFORMATION, PRICES AND PAYLOADS

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LUBBOCK MACHINE & SUPPLY CO

P. O. BOX 1138 PHONE 3-4631 LUBBOCK, TEXAS

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the clothes dryers with the sunshine built in!

NO HEAVY BASKETS TO CARRY

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THE STIGLITZ CORPORATION Louisville 3, Kentucky

The Oldest Store Manufacturer in America

SERVEL WORLD'S FIRST

MAKES ICE CUBES

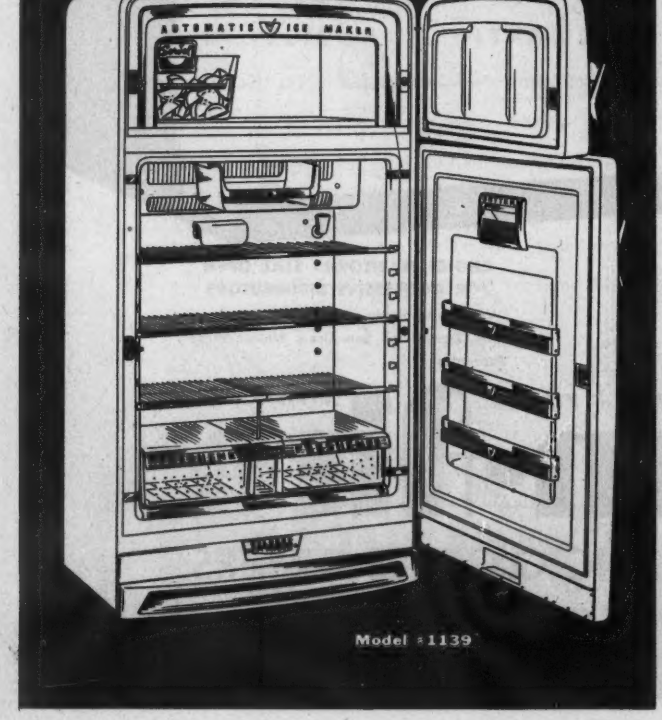
and puts 'em in a

NO TRAYS TO FILL!

NO TRAYS TO SPILL!

NO TRAYS TO EMPTY!

OR FORGET TO REFILL!



JUST REACH IN—Take one or a handful! Cubes are dry, loose, ready-to-use!

CONTINUOUS SUPPLY! Keeps refilling the basket night and day! Replaces ice cubes as you use them! All automatically!

SUPER CUBES! Extra-big, extra-cold, *Ice-Circles!* Always full size! Plenty for parties!

CUBES WON'T STICK together in freezer—even during automatic defrosting!

FIELD-TESTED in hundreds of homes for 2½ years! Special allowance from Servel to cover installation costs!

EXTRA FEATURES GALORE! From Automatic Defrosting to 80-lb. Freezer—Servel has them all!

America's only
SILENT, MOTORLESS GAS FREEZING SYSTEM!
No moving parts! Plus the industry's only
10 YEAR WARRANTY!

AND ONLY REFRIGERATOR THAT

WITHOUT TRAYS

basket AUTOMATICALLY!

MOST SENSATIONAL OPPORTUNITY TO INSURE—AND INCREASE—YOUR YEAR 'ROUND KITCHEN LOAD SINCE THE GAS RANGE WAS INVENTED!

First truly *revolutionary* feature ever built into a refrigerator! Servel's Automatic Ice-Maker makes *every* other refrigerator as out-of-date as last year's newspaper!

Once a prospect sees it, he'll *never* be satisfied with anything else! It's a sensational reason for *every refrigerator owner* to buy a new Servel *now*—even if their old refrigerator is just a year or two old!

Servel's Automatic Ice-Maker gives you a new and golden opportunity to capture a major part of the year 'round kitchen load! See the big dealer premiere in your area!

Servel

The name to watch for great advances in REFRIGERATION and AIR CONDITIONING

Servel Inc., Evansville 20, Indiana
In Canada, Servel (Canada) Ltd., 548 King St. W., Toronto, Ontario

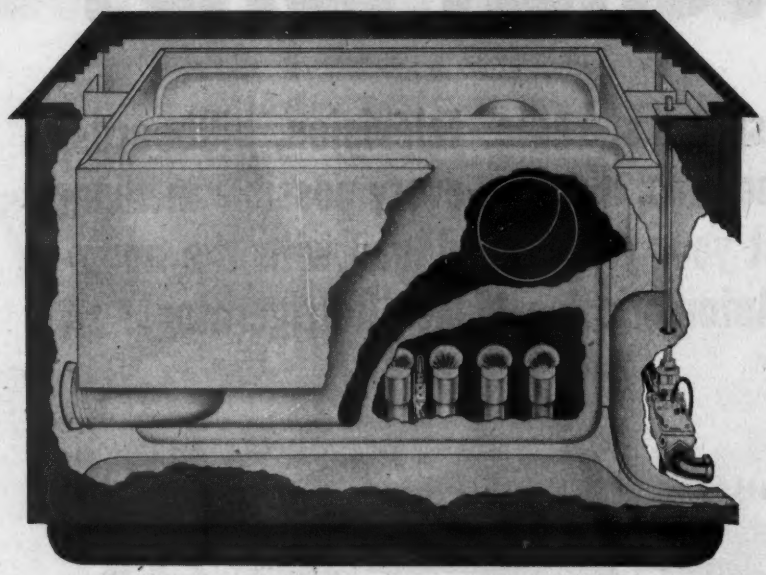
Call your Servel Distributor for Time—Place—Date!

6 MILLION SERVEL A
BACK YOUR '53 DRIVE F

ADVERTISING DOLLARS FOR KITCHEN LOAD!

Magazines, newspapers, radio, television, billboards, direct mail, promotions, display—every possible medium to help you boost your year 'round load with the amazing new Servel Automatic Ice-Maker Refrigerator!

The NEW EMPIRE



Gas FLOOR FURNACE

QUALITY AND PERFORMANCE NEVER EQUALLED

Porcelain enameled or standard steel heat exchangers. EXPANSION AND CONTRACTION NOISES reduced to a minimum by a specially designed heat exchanger — NO LOUD TICKING — NO BOOM — NO BANG.

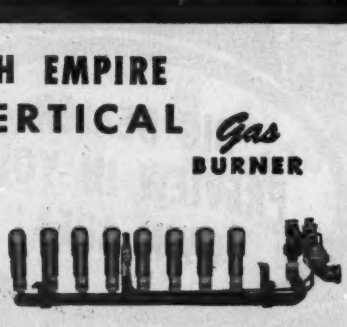
★ ★ ★

New VERTICAL THRIFTMATIC BURNER IS AS SILENT AS A KITTEN WITH AN EXTRA SET OF FOOT PADS — Precision machined inside and out to provide an even unrestricted flow of gas and air. NO RESONANT NOISES — NO INSPIRATION NOISES — NO SERVICE CALLS.

EXCLUSIVE WITH EMPIRE

The FAMED VERTICAL Gas BURNER

"Thriftmatic"



APPROVED AGA

Designed and Patented by Empire, the vertical Thriftmatic burner provides top efficiency and maximum economy. ENGINEERED for all types of gases — MIXED, NATURAL or L-P.

See your local EMPIRE REPRESENTATIVE or write direct to EMPIRE

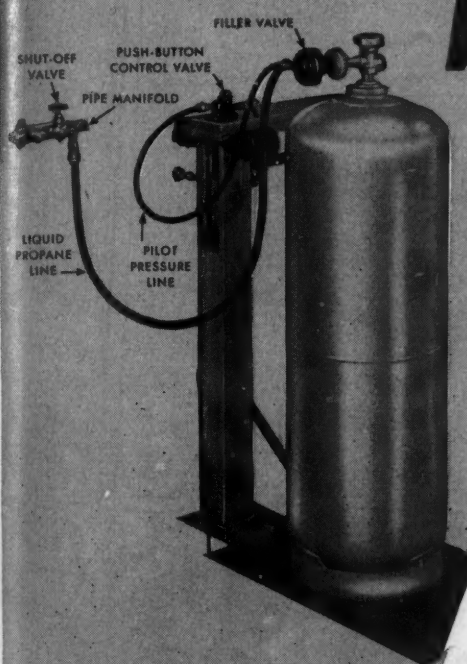
EMPIRE STOVE COMPANY

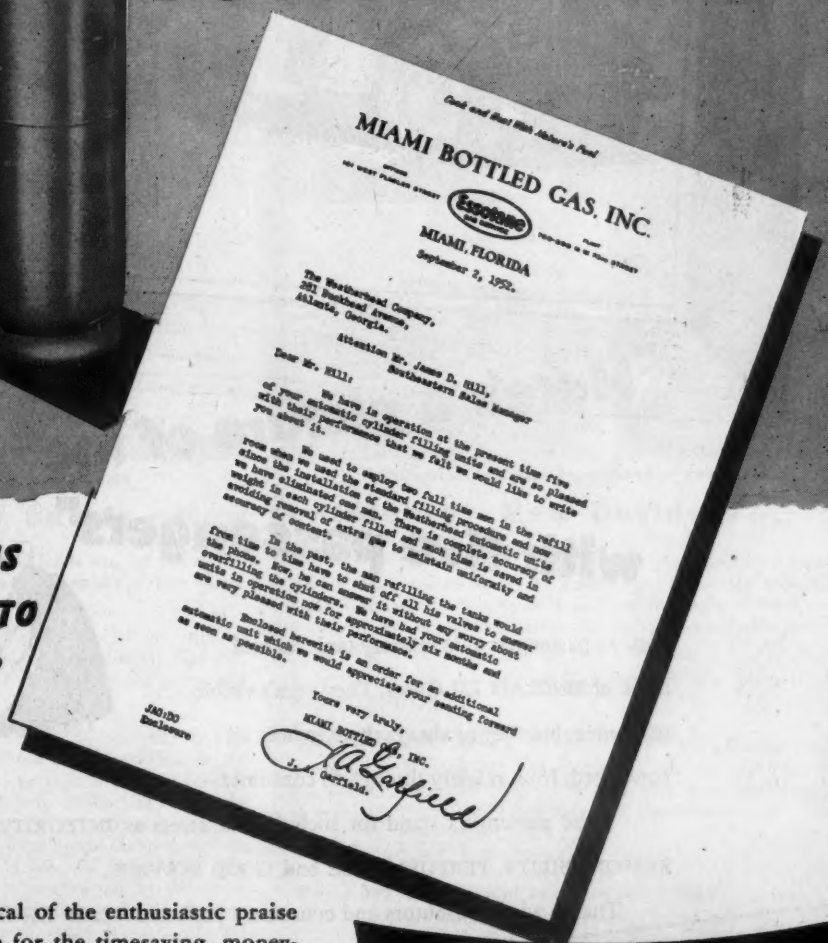
BELLEVILLE, ILLINOIS

WORLD'S LARGEST MANUFACTURER OF Gas FLOOR FURNACES

"...very pleased with their performance"

WEATHERHEAD *Automatic* BOTTLE FILLER





MIAMI BOTTLED GAS, INC.

MIAMI, FLORIDA

September 2, 1952.

The Weatherhead Company,
301 Fairhead Avenue,
Atlanta, Georgia.

Attention Mr. James D. Hill,
Southeastern Sales Manager

Dear Mr. Hill:

We have in operation at the present time five of your automatic cylinder filling units and are so pleased with their performance that we felt we would like to write you about it.

From when we used to employ two full time men in the refill since the installation of the Weatherhead automatic units we have eliminated one man. There is complete accuracy of weight in each cylinder filled and much time is saved in avoiding removal of extra gas to maintain uniformity and accuracy of content.

From time to time, the man refilling the tanks would the phone. Now, he can answer it without any worry about overfilling the cylinders. We have had your automatic units in operation now for approximately six months and are very pleased with their performance.

Enclosed herewith is an order for an additional automatic unit which we would appreciate your sending forward as soon as possible.

Yours very truly,

MIAMI BOTTLED GAS, INC.

J. L. Garfield.

JAG:DO
Enclosure

WHY NOT PUT THIS STAR PERFORMER TO WORK FOR YOU?

The above letter is typical of the enthusiastic praise dealers everywhere have for the timesaving, money-saving performance of the Weatherhead Automatic Bottle Filler.

Proved by years of actual service in bulk plants, this unit is accurate, safe, simple to operate—and may be used with any common beam scale. Don't let another day go by without investigating its use in *your* plant—write now for details. THE WEATHERHEAD COMPANY, Dept. G-1, 300 East 131st Street, Cleveland 8, Ohio. Warehouses in Albany, N. Y.; Atlanta, Ga.; Dallas, Texas; Memphis, Tenn.; Minneapolis, Minn.

The Mark of Quality

WEATHERHEAD

ENGINEERING ABILITY
MEANS PRODUCT DEPENDABILITY!

"Here's a picture of me with five passengers"

Unseen passengers ride in every tank car and truck of SINCLAIR LP-Gases. They aren't visible to anyone, but they're always there to help all concerned, from refinery through to consumer.

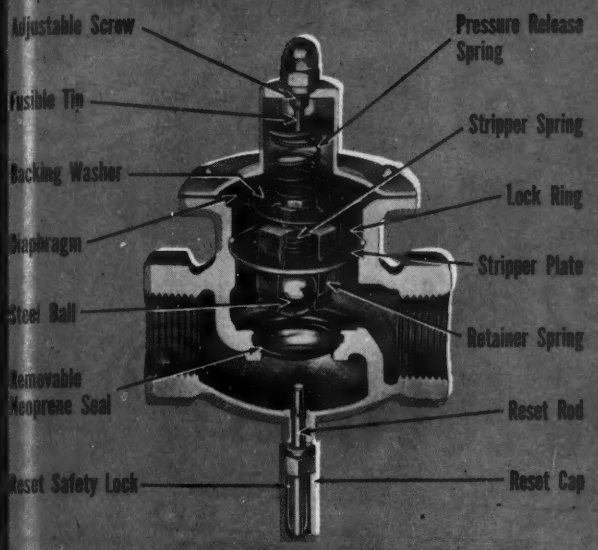
These passengers stand for such *hidden assets* as INTEGRITY, REPUTATION, RESPONSIBILITY, PERFORMANCE and GOOD SERVICE.

That is why distributors and consumers prefer SINCLAIR LP-Gas, for its high heating values, with moisture and impurities removed. *Investigate.*

SINCLAIR

A Great Name in Oil

SINCLAIR OIL & GAS COMPANY • Liquefied Petroleum Gas Division • Sinclair Building, Tulsa, Okla

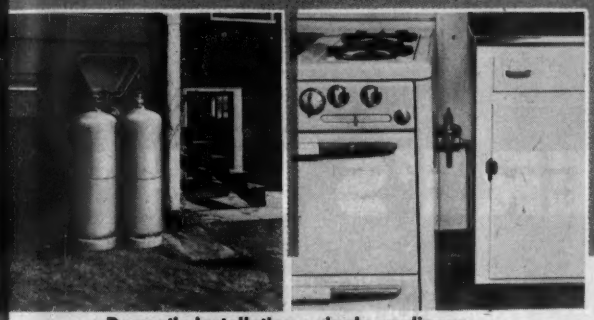


COCKED POSITION

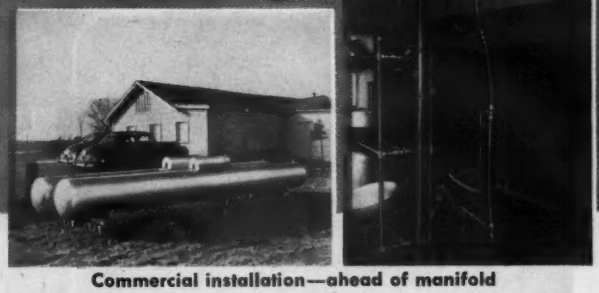
POLY-TROL

SAFETY SHUT-OFF VALVE*

New Protection for LP gas installations



Domestic installation—single appliance



Commercial installation—ahead of manifold

Means New Safety – New Confidence – New Business

LP Gas has a tremendous future. LP Gas is one of the finest and safest fuels known. The safer we can make it, the faster it will grow.

Handley-Brown, as a long time supplier to the LP industry, is interested in seeing that growth continue. The new small Poly-Trol Valve is our answer to your problem of providing added safety and added assurance to your customers.

HERE'S WHAT POLY-TROL WILL DO FOR YOU— Install Poly-Trol in the line just inside the building, ahead of the manifold or the appliance, if only one. No special tool or skill is required. OVER PRESSURE, caused by a failure anywhere in the line, drops the ball instantly. Service is shut off completely and *automatically*. Dangerous overgassing is prevented. What might happen without Poly-Trol protection? If the range is in use, will flames leap high in the air out of control? Will they be snuffed out by the excessive pressure, and allow pockets of gas to collect and explode when ignited by a spark or flame? *OR*, with range controls off, will gas blast its way past the valve stems releasing thousands of BTU's of potential destruction? Will the housewife remember what to do? Will there be time? With Poly-Trol there is nothing to remember, nothing to forget. Shut-off is automatic and *before* excessive pressure reaches the appliance.

POLY-TROL DOESN'T STOP THERE. In case of fire, approximately 200° F. temperature causes the fusible tip to telescope and ball to drop. Gas is cut off completely and *automatically*. Regardless of damage to fittings or appliances, no gas can escape. Firemen can quench flames without fear of gas explosions.

Reset in seconds to continue guarding life and property once danger is passed.

WHAT DOES POLY-TROL PROTECTION COST? It's infinitesimal when compared to the possible loss of life, ill will and expense caused by just one "incident". Explain to your customers what Poly-Trol is doing for them. You'll find Poly-Trol *builds business.*

SIZES — ½", ⅜", ¾", 1", and 2".

Why wait? Fill out and mail coupon today.

HANDLEY-BROWN HEATER COMPANY
2505 BROOKLYN ROAD • JACKSON, MICHIGAN

Send _____ sample valves, tapped ⅜", tapped ½" (cross out one) at $7.42 single lot price.

☐ Send further information.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

HANDLEY-BROWN HEATER CO.

*Trademark Patent Applied For

ANCO

the best place to buy—

LPG EQUIPMENT

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IMMEDIATE PICK-UP OR DELIVERY FROM STOCK

CONVENIENTLY LOCATED WAREHOUSES

QUICK DELIVERY ON PHONE ORDERS

QUALITY PRODUCTS

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MANUFACTURING & SUPPLY CO.

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BRANCH OFFICES

MINNEAPOLIS, MINNESOTA • OMAHA, NEBRASKA • EAST ST. LOUIS, ILLINOIS

and Last

First Name in Hose Reels

HANNAY

HANNAY has a hose reel for every purpose, for every business or industry employing hose.

In the petroleum and chemical industries, in aviation, and among the nation's leading manufacturers of fire fighting equipment, the name HANNAY is synonymous with "best".

Stationary and mobile types, hand or motor operated. Also special reels for special jobs such as cable reels for portable X-ray and lighting installations.

When good hose reels are needed, standard or special purpose, put your problems up to Hannay.

New EXPLOSION-PROOF Model

Developed to overcome dangers previously associated with electrical rewinds. Sealed, Underwriters-approved motor protected against fog, foam, water and fumes. Safe, controlled rewind speed. Acclaimed by users, "the safest, most efficient Hose Reel ever built!"

Look for this...

©1952 C.B.H. & S., Inc.

HANNAY
REG. U. S. PAT. OFF.
HOSE REELS
CLIFFORD B. HANNAY & SON, INC.
WESTERLO, NEW YORK

Proudly Presenting

THE NEW

Caloric

AUTOMATIC GAS CLOTHES DRYER

with Revolutionary

LO-HEET

HI-BREEZE

Drying Principle

The greatest clothes drying improvement since dryers were invented! Cuts drying time! Cuts fuel costs! Guards against shrinkage! Protects even the filmiest fabrics from excessive heat! Greatly reduces wrinkling! Fluffs up the clothes beautifully!

It's here!... an Automatic Clothes Dryer so different from conventional dryers that it is years ahead of its time.

The powerful Caloric Blower draws more air through the drying cylinder than other dryers. The temperature in the drying cylinder is the lowest of any dryer. This combination of LO-HEET—HI-BREEZE gives amazing results. It dries anything from nylons to blankets, from dungarees to dacrons, with complete safety because *automatically* controlled LO-HEET can not harm even modern, synthetic fabrics.

ENDS LINT PROBLEMS Caloric solves the lint problem with an entirely new type of lint screen, located in a waist-high position at the *front* of the Dryer.

SOLVES SERVICE PROBLEMS All controls are easily reached by removing top housing or entire front panel. Dryer need never be moved! It is the easiest of *all* dryers to service. Caloric Stove Corp., Topton, Pa.

Compare It, Feature by Feature!

LO-HEET– HI-BREEZE Drying Principle • One Knob Control • Porcelain Enamel Top • High-temperature Baked Enamel Body • Exclusive Flush-to-wall Construction • Waist-high Lint Screen • Rubber Mounted Cylinder • Easiest to Service • Sturdy Steel Chassis • Adjustable Leveling Base • Powerful ⅓ H.P. Motor • Automatic Shut-off on Loading and Lint Doors • Sweet-aire Lamp • Drop Door.

"Worthy of a Great Name"

See it at
Space 519
American Furniture Mart
Chicago

Space 9-25,
Showroom 435
San Francisco Market

Space 36
Los Angeles Furniture Market

Caloric®

AUTOMATIC GAS CLOTHES DRYER

....."Build YOUR volume with the BEST-SELLING GAS BROODER in the BUSINESS!"

A. R. WOOD RADIANT GAS BROODERS

. . . Specially Designed For LP Gas!

For quick reference the important points about the A. R. Wood original *Radiant* GAS BROODER are listed below. For greater profits - for satisfied customers - sell the brooder that has *extra* selling points.

- **APPROVED BY LEADERS**

  It's the gas brooder that's *approved* by leading poultry experts, by major gas and oil companies . . . that's *first choice* of poultrymen and turkey growers.

- **MULTIPLE ALUMINUM BURNERS**

  Multi-burner design is far superior to single burner design. Higher ratio of heat produced to amount of gas burned. Uniform heat spread under canopy assured . . . hot spots eliminated.

- **PATENTED FLASH TUBES**

  All multi-burners are connected by flash tubes for greater safety. Only one pilot will flash all burners into action should other pilots go out. It's the *only* gas brooder with flash tube safety.

- **EXTRA LARGE CANOPY**

  In addition to the 6 foot (500 chick — 8,900 BTU capacity) canopy there is also the giant 8 foot (1000 chicken — 13,350 BTU capacity) canopy...the largest gas brooder on the market.

- **PORCELAIN CLAY REFRACTORIES**

  The best method of even, radiant heat distribution over entire floor area under canopy, *much* superior to mere reflectors! Finest porcelain clay used. Refractories are designed to radiate heat rays from burners in downward direction.

- **FACTORY TESTED**

  Brooder head is connected to gas line and accurately adjusted . . . each brooder part is rigidly tested . . . all before brooder is shipped from the factory.

- **ASSEMBLY AND OPERATION**

  Each brooder is shipped with complete instruction book and all parts necessary for quick, simple assembly. Brooder is assembled as one unit for ease in handling and cleaning.

- **SAFETY FEATURES**

  Heating units rigidly fixed in brooder head a safe distance above floor . . . cannot ignite litter or overheat chicks or poults. Flash tubes prevent dangerous gas loss. Vent ports in brooder head insure complete ventilation at all times.

- **100% SAFETY SHUT-OFF**

  New, specially designed BASSO CONTROL available on all A. R. Wood *"Radiant"* Gas Brooders at additional cost.

- **AUTOMATIC THERMOSTAT CONTROL**

  Cast bronze thermostat unit has only one moving part. Keeps brooder temperature within approximately one degree of desired temperature regardless of outside temperature changes. Can be adjusted from outside canopy.

Write For Complete Proposition For Dealers!

A. R. WOOD MFG. CO.

SANTA CRUZ, CALIFORNIA — LUVERNE, MINNESOTA

Your New Catalog on BUEHLER LP-Gas PLANTS

If you want to see the finest display of LP-Gas plants ever cataloged – if you are an aggressive LP-Gas dealer you will want to study this new Buehler catalog. You will see the LP-Gas plants long famous for "QUALITY YOU CAN SEE". You will see it in the most popular sizes ever built; sizes proved by experience to be the most practical for domestic and commercial uses.

We are constantly striving to improve our product. Take for example, the arrangement of fittings on top the tank. Our engineers studied the causes of many unfortunate field experiences in the filling operation. They came up with the idea of arranging fittings in a manner practical for easy connection and disconnection –an arrangement for SAFE filling. Scores of other improvements are incorporated in our present day Buehler LP-Gas plants. You can count on it, BUEHLER is your best buy. Request your copy of the new catalog today.

BUEHLER

QUALITY YOU CAN SEE

TANK & WELDING WORKS

5000 PACIFIC BLVD., LOS ANGELES 58, CALIFORNIA

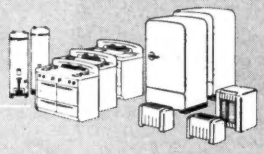
Make '53 a BIG Business Year

Get the most out of your Potential Market by using Simplified Installment Sales Plans

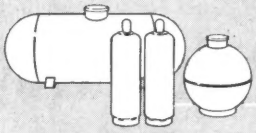
The backbone of modern appliance business is installment selling. This can mean more gas customers for you. Our simplified financing plans are being successfully used by hundreds of dealers . . . they can help you!

4 Basic Plans Are Offered:

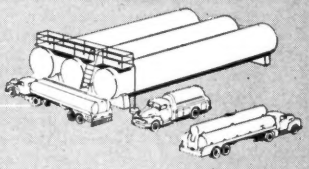
☆ **Retail Installment Financing of sales to gas customers. In one package, LPG Credit Corporation finances the appliances, the lease fee (when container is leased) or the sale price of the complete installation (when sold outright) and the initial sale of gas.**



☆ **Floor plan for financing inventories of appliances and containers intended for resale.**



☆ **Financing of Cylinders and Tanks for dealers leasing systems to retail customers.**



☆ **Financing of Bulk Storage Tanks, Tank Trucks and Transports.**

Sales Promotion

As part of its services, LPG Credit Corporation offers a merchandising policy and complete advertising and sales promotion program as effective sales tools, including showroom display material, newspaper ad mats, radio spot announcements and direct mail booklets.

Inquiry on your company letterhead is invited.

LPG

LPG CREDIT CORPORATION

312 EAST 131st STREET • CLEVELAND 8, OHIO

WHY METERED SERVICE PAYS!

TABLE 1. AN ANALYSIS OF REASONS GIVEN BY 121 GAS CUSTOMERS FOR CHANGING THEIR GAS SUPPLY SOURCE.

Reason Given By Customer For Changing	Number Changed	Percentage Changed
Unsatisfactory service	29	23.96
Customer believes dealer has cheated him	17	14.04
Lower price quoted by competition	14	11.57
Over-sale by dealer	13	10.74
Friendship or relation to competitive dealer		
Business relationships with dealer making change		60.31
Geographical location		

Reproduction of the first four items of a table printed in Butane-Propane News, August, 1952

60.31% of these customers changed dealers for reasons that Rockwell meters would prevent

THE LITTLE METERS YOU NEED

This Rockwell meter in its sturdy leak and corrosion resistant aluminum alloy case was especially designed for LP-gas. Compact dimensions conserve space, ease handling. Inner working mechanism is unfailingly accurate, stays so for years. Exclusive design eliminates maintenance problems. No other meter offers so great a value and convenience.

Let's see how Rockwell meters would have prevented the loss of these customers. Consider the matter of *unsatisfactory service.* This usually results from "out of gas" calls, often at unreasonable hours. With meters you can keep your customers' tanks full, and use them to help solve your storage problems. With meters, too, no customer can claim he has been *cheated.* He pays for only the gas used and no more. In the matter of a *lower price,* with metered service you can establish sliding scale rates that help you sell big profit appliances. Finally, with meters there is no temptation for an *oversale* of gas that can create ill will.

Chances are the customers tabulated above changed to dealers offering metered service. Isn't it time you changed over your operation and gained all the advantages Rockwell LP-gas meters alone offer? Write for catalog and price list.

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. • Atlanta • Boston • Chicago • Houston
Kansas City • Los Angeles • New York • Pittsburgh • San Francisco
Seattle • Tulsa

ROCKWELL

You Can RELY ON ROCKWELL

ROCKWELL LP-GAS METERS

The DUO-THERM Story on LP-gas

short, sweet, profitable

HOME HEATERS

Windsor Console 1457
60,000 BTU input

Mayfair 1101 and 1201
23,000 and 33,000 BTU

Chippendale 1410 and 1460
50,000 and 60,000 BTU

Mayfair 1102 and 1202
23,000 and 33,000 BTU

Chippendale 1405 and 1455
50,000 and 60,000 BTU

Approved by the American Gas Association

Duo-Therm leadership in home heating appliances is an open book. For over 25 years Duo-Therm has set the standard in engineering, in styling, in performance. More than 2 million warmly satisfied customers prove it.

So our story is short and simple. Satisfy *your* customers with every phase of your LP-Gas service. Give them the best in cleanliness, convenience, heating efficiency. Pave the way for more appliance sales and more LP-Gas business. *Install Duo-Therm vented LP-Gas heating appliances.*

- Trouble-free burner performance in every Duo-Therm LP-Gas appliance. Tapered profile and inner baffle produce a uniform blue flame at every port, on every fire setting.
- All-in-One Control on Duo-Therm home heaters and floor furnaces makes installation simpler. Thermostats easily added without cutting gas line.
- Duo-Therm water heaters feature thick spun-glass insulation, heavy-duty steel tank zinc-lined for longer life. 10-year warranty.
- Clear-cut trade policies and generous discounts.
- Local LP-Gas promotion material to help you sell your service. National advertising to back you up.

FLOOR FURNACES

201—24,500 BTU
Floor or Wall Reg.

241—28,000 BTU
Floor or Wall Reg.

202—35,000 BTU
Floor or Wall Reg.

242—42,000 BTU
Floor or Wall Reg.

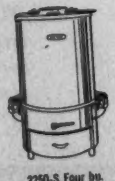
DUO-THERM *Always the Leader*

Division of MOTOR WHEEL CORPORATION • Lansing 3, Mich.

INCINERATORS

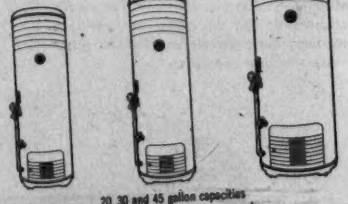
2200-T Two bu.
Clock-Timer control

2200-S Two bu.
Manual control



2250-S Four bu.
Manual control

WATER HEATERS



20, 30 and 45 gallon capacities
Automatic controls—10-yr. warranty.

Contact your Duo-Therm distributor or write direct to address above

DUO-THERM is a registered trade mark of the Motor Wheel Corporation • Copyright

how SUPERIOR

turned DEADWEIGHT

into PAYLOAD for ANDREWS BUTANE CO.

In 1948 the Andrews Butane Co. of Long Beach, California, started out with a single SUPERIOR truck and trailer tank unit. It delivered 7200 payload gallons, and was the most advanced and efficient unit of its day. Andrews is now operating seven rigs and each succeeding SUPERIOR job has delivered more payload gallons and eliminated more excess deadweight.

The latest SUPERIOR unit created for Andrews features the sensational new INTEGRAL Tank-Trailer, carries 8000 payload gallons, and is making bigger profits every day for this rapidly expanding organization.

CONSULT US TODAY! Our engineering and designing staff is at your service for preliminary designs and estimates at no cost to you.

INTEGRAL TANK-TRAILERS
Another SUPERIOR Engineering Achievement

1. Axles, wheels and springs are attached directly to the ends of the tank, eliminating separate trailer frames.
2. The main source of trouble — the frame — is eliminated.
3. Load shock is absorbed by trailer springs, not frame.
4. Lower center of gravity gives easier handling and better towing.
5. The tank is welded to a small sub-frame and not bolted as in old style trailers.
6. Elimination of 700 to 1100 pounds of deadweight means less operating cost, more payload and bigger profits for you.

SUPERIOR TANK AND CONSTRUCTION COMPANY
6155 SO. EASTERN AVE. • LOS ANGELES 22, CALIF. • Phone: UNderhill 0-1151

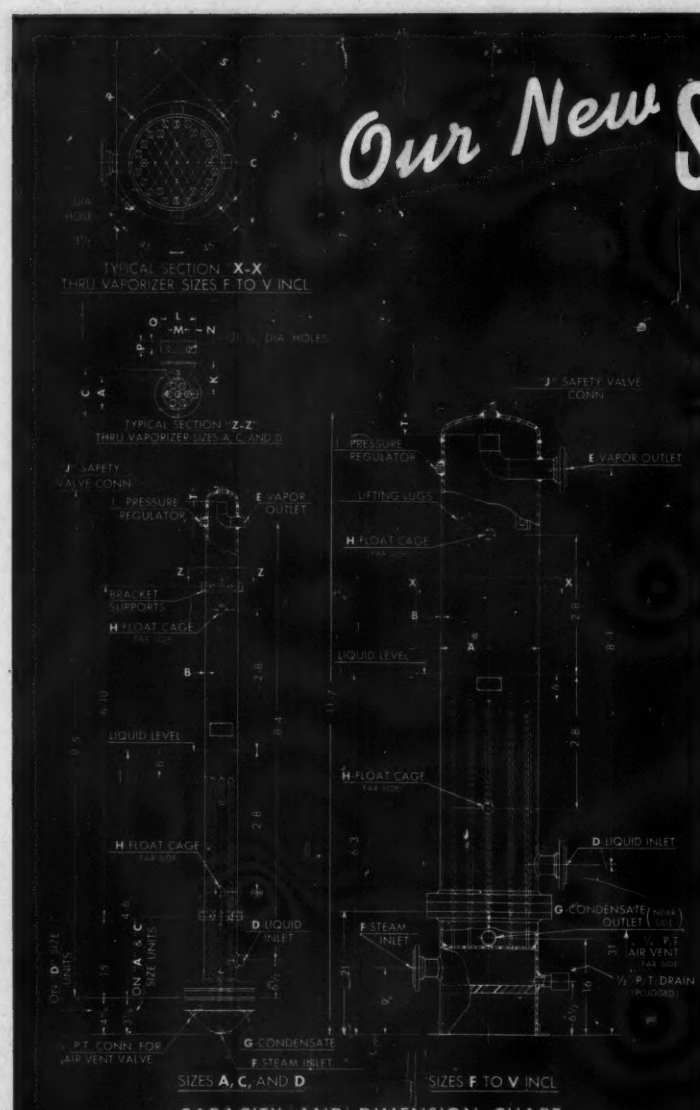
Our New SERIES 48E

Paracoil LPG STEAM VAPORIZERS

FOR MEDIUM AND HIGH CAPACITY LPG SYSTEMS

Continuous full load operation at any desired gas pressure, regardless of ambient temperature conditions, is assured with the industry tested PARACOIL LPG VAPORIZER! It offers proven advantages possessed by no other design! Check these features...

- **Patented Non-Freezing Condensate Drainage System!**
- **Tubular Type Heating Element Proven in Thousands of Heat Exchangers!**
- **High Output Capacity — Production Models Up to 6000 GPH Per Unit!**
- **Installed Entirely Outside the Tank — Easy Access to Heating Surface For Inspection!**
- **Can Be Used With Any Type of LPGas!**
- **Entirely Safe — No Gas Flames Used. Operates on Low Pressure Steam!**


TYPICAL SECTION X-X THRU VAPORIZER SIZES F TO V INCL
TYPICAL SECTION Z-Z THRU VAPORIZER SIZES A, C, AND D
J SAFETY VALVE CONN
I PRESSURE REGULATOR
E VAPOR OUTLET
LIFTING LUGS
H FLOAT CAGE
BRACKET SUPPORTS
LIQUID LEVEL
D LIQUID INLET
G CONDENSATE OUTLET
F STEAM INLET
½ P.T. AIR VENT
½ P.T. DRAIN (PLUGGED)
½ P.T. CONN. FOR AIR VENT VALVE
G CONDENSATE
F STEAM INLET
SIZES A, C, AND D
SIZES F TO V INCL

CAPACITY AND DIMENSION CHART

All dimensions in inches — Subject to change without notice

SIZE	CAPACITY Gals./Hr.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	APPROX. Wt./Lbs.
A-48E	110	4	.226	8	1½	1½	1¼	½	1½	1½	5	6	4	1	2½	1½			2	170
C-48E	220	5 5/16	.258	9⅝	1½	1½	1½	½	1½	1½	5½	6	4	1	2½	1½			2	260
D-48E	315	6½	.280	11	1½	1½	2	¾	1½	1½	6	6	4	1	2½	1½			2	350
F-48E	450	8½	.277	12	2	2	2½	¾	2	1½							13½	7 5/16	2½	530
H-48E	900	10¾	.307	14½	2	2	2½	¾	2	1½							14¼	8¾	3½	820
K-48E	1200	12¾	.330	16½	3*	3*	3	1	2	2½							16¼	9⅜	3½	1000
L-48E	1600	14	5/16	18½	3*	3*	3	1	2	2½							17½	10	3½	1300
N-48E	2100	16	5/16	20½	3*	4*	4†	1½	2	2½							19½	11	5	1500
P-48E	2500	18	5/16	22½	3*	4*	4†	1½	2	2½							21½	12	5	2100
R-48E	3600	20	⅜	24½	4*	6*	4†	1½	2	4*							23½	13	5	2400
T-48E	5000	22	⅜	27	4*	6*	6†	2	2	4*							25½	14	5	3200
V-48E	6000	24	⅜	29	4*	6*	6†	2	2	4*							27½	15	5	3800

*—Flanged Conn. 300 Lb. Design, Raised Face.
†—Flanged Conn. 150 Lb. Design, Raised Face.
All Other Connections are Couplings.
Capacities Based on Propane Boiling at 32°F. Steam at 5 PSIG.

SPECIFICATIONS

MATERIAL

Shell.....Seamless Steel Pipe, A-53, Gr. A
Outer Vaporizing Tubes....⅝" OD x 16 BWG Steel, A-214
Inner Steam Conveyor Tubes
½" OD x 20 BWG Steel, A-214
Shell Tube Sheet and Flange....Flange Steel, A-285, Gr. C
Steam and Condensate Channel
Size A, C, & D—Cast Iron A-48, Cl. 30
Sizes F to V incl.—Seamless Steel, A-53, Gr. A
Gaskets .....Compressed Asbestos

DESIGN

ASME Stamped. Par U-69. Inspection Certificates on Order
N.B.F.U. Pamphlet No. 58, Latest Issue
Working Pressure:
Shell 250 PSIG & 250°F (Liquid and Vapor Sides)
Tubes 100 PSIG & 250°F (Steam and Condensate Sides)
Test Pressure:
Shell 500 PSIG Hydrostatic
Tubes 200 PSIG Hydrostatic
Shell Side Flange—M. & F. Joint Design
Outer Vaporizing Tube Holes are Double Serrated for insurance against leaks.

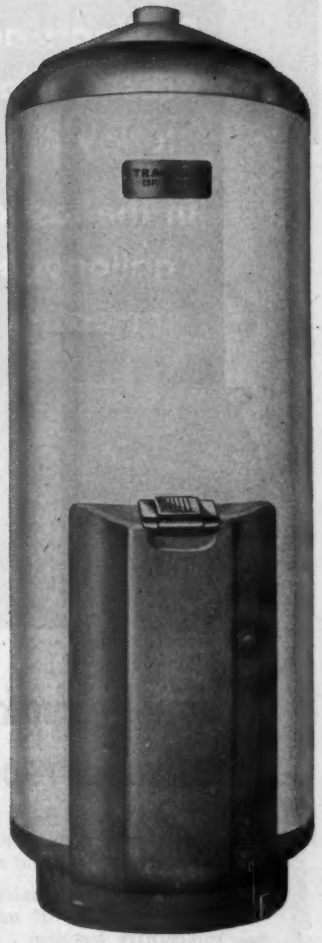
WRITE FOR
ADDITIONAL DATA AND PRICES
DESIGNS MAY BE VARIED TO MEET SPECIAL JOB CONDITIONS

DAVIS ENGINEERING
CORPORATION

1058 E. Grand St., Elizabeth 4, N. J. • 30 Rockefeller Plaza, New York 20, N. Y.

the

Automatic Gas Water Heater is Ready!



THIS is a *quality* heater on which you can count for a lifetime of service, free of repairs and replacements.

Trageser engineers have devoted many years to the development of a water heater which would meet the century-old tradition of Trageser quality, would use pure copper for heating and storing the water, and yet would be reasonably priced. The "Copper Core" Heater fulfills these requirements.

Its central element — the core — is a rugged copper tank, immune to rust and corrosion. This is completely encased in a heavy steel tank to make a unit of extraordinary strength and durability.

All working parts of the new Trageser Copper Core Heater are concealed from view. All are immediately and easily accessible inside the front cover plate. Central flue and new type flue baffle give maximum heat transfer and high recovery rate. High-wall combustion chamber provides a deep sludge well and minimizes the effect of sludge accumulation. A.G.A.-approved.

Send for catalog and price list.

The NEW Trageser Copper Core Automatic Gas Water Heater

Trageser Copper Core Tank
Capacities: 30, 45, 60 and 80 gallons (30- and 45-gallon sizes available now in limited quantities; larger sizes later)
Operates on natural, manufactured, LP, mixed, and LP-air gases.
Guarantee: 10 years in accordance with warranty.
Rockwell Gas Regulator
Grayson Unitrol
Fiberglas Insulation
Approved by A. G. A.
Send for catalog and price list.

AMERICAN GAS ASSOCIATION APPROVED

TANKS by TRAGESER

TRAGESER COPPER WORKS, INC., 5000 Grand Ave., Maspeth 78, New York • Phone EVergreen 6-4000

You helped make this possible...

20 Years ago LP-Gas cost 20¢ a pound... today it is about 10¢

In the last decade, gallonage sold has increased 1380%

But are you getting your share of today's business?

How to make sales and influence repeat LP-Gas Orders

The rapid and successful growth of the LP-Gas Industry is largely due to progressive businessmen who saw a market and went out and sold it.

You, the LP-Gas Dealer, have contributed to the comfort and convenience of millions of Americans. But it's a competitive business . . . as you know. When you look around for a way to sell new customers—to hold your old ones—you should well consider *the* propane system which is *your* key to profitable sales. One of the best ways to keep customers happy and coming back for LP-Gas is to sell them the propane system that gives service . . . that's dependable and efficient. BS&B Perfection Propane Systems will do just this. Manufactured by a 60 year old company who knows pressure vessels, these systems are easier to sell, faster to install, easier to service . . . and they give years of safe, trouble-free performance. They're constructed, tested and proved under rigid code specifications . . . available in 250, 500 and 1000 gallon capacities.

Propane Equipment Division, Dept. 6-AB1

BS&B PERFECTION PROPANE SYSTEMS

PROPANE OUR 60TH YEAR BS&B SYSTEMS

BLACK, SIVALLS & BRYSON, INC.

7500 East 12th Street Kansas City 26, Missouri

FEATURE FOR FEATURE...

DRY CHEMICAL

C-O-TWO

FIRE EXTINGUISHERS

are your best buy!

exclusive inverting design renders constant free flowing dry chemical, assuring faster, more effective and complete discharge

● These fast, positive fire killers are easy to operate, compact, well-balanced and offer extensive maneuverability indoors or outdoors... no extra gadgets protruding or complicated operating parts. The outstanding mechanical breakage feature of C-O-TWO Dry Chemical Type Fire Extinguishers, plus continuous inert gas pressured agitation or fluffing, together with a skillfully blended free flowing dry chemical guarantee lasting, foolproof fire protection. All sizes are rechargeable on-the-scene by anyone... no special tools required.

C-O-TWO Dry Chemical is a finely pulverized powder... non-conducting, non-corrosive, non-abrasive, non-freezing and non-toxic... special compound consists of sodium bicarbonate and other chemicals skillfully blended to render high fire extinguishing qualities, remain free flowing while being used and withstand long periods of storage without deterioration. When brought into contact with fire, C-O-TWO Dry Chemical absorbs a greater part of the heat, decomposes and releases fire killing gases. This heat absorption process acts as an insulating screen for the fire fighter.

Fully approved and built to rigid specifications... C-O-TWO Dry Chemical Type Fire Extinguishers are exceedingly effective on flammable liquid, gas and electrical fires, as well as surface fires involving ordinary combustible materials... rated by Underwriters' Laboratories, Inc. and Factory Mutual Laboratories for class B and C fires.

Convenient 4, 20 and 30 pound hand sizes... no syphon tubes or valves within the cylinder to become clogged or inoperative... discharge hose and squeeze type discharge nozzle remain empty until actuation takes place... one piece removable top assembly.

Also, convenient 150 pound wheeled size... sturdy, wide-faced wheels... discharge hose and two position discharge nozzle having soft or solid stream fully enclosed in protection casing... footrail and dual bar handle provide easy inverting.

Act now for complete free information on these top quality fire extinguishers. Remember... you can't put fire off... fire doesn't wait. Get the facts today!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-in High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-in Smoke and Heat Fire Detecting Systems

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY

C-O-TWO FIRE EQUIPMENT OF CANADA, LTD. • TORONTO 8 • ONTARIO

Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

TRINITY STEEL

offers the

NEW **VICTORIA MODEL**

manifolded to dealer's specifications

Available with or without recessed fittings

SIZES
4750 through 6700 water gallons

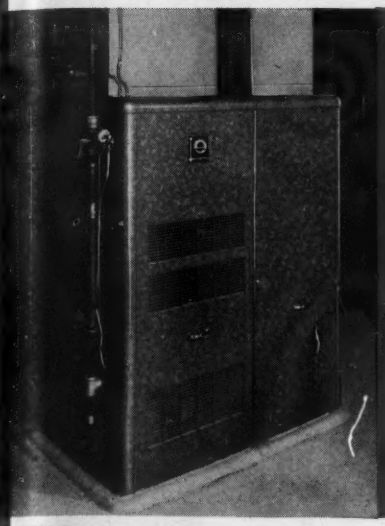
WRITE, WIRE OR PHONE US FOR QUOTATIONS

TRINITY STEEL COMPANY INC.

EVEREADY

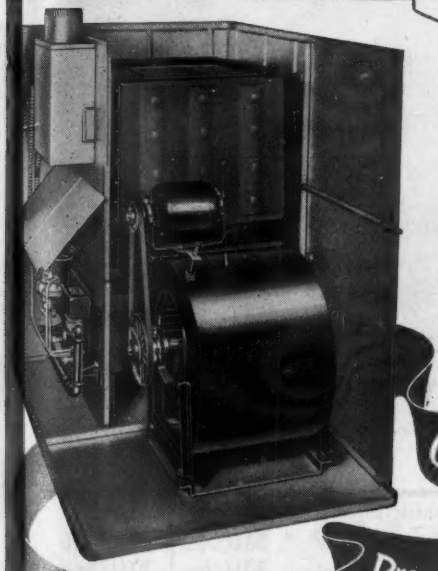
C. J. BENDER

3301 SOUTH LAMAR STREET TEL. HUnter 8321 DALLAS, TEXAS



The SENECA Winter Air Conditioner by AMERICAN-Standard

meets all requirements for your small to medium sized modernization jobs



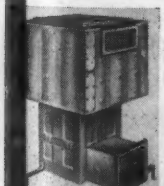
THE SENECA is a gas fired basement type winter air conditioner that you can sell for the majority of the homes in your territory. For this smart looking unit is available in four sizes—from 85,000 to 150,000 Btu input capacity—and covers the heating requirements of houses in the popular small to medium size range.

Compactly housed in a sturdy jacket that's handsomely finished in Forge Red, the Seneca is ideal for transforming bleak basements into attractive recreation and utility rooms. To help you sell the Seneca for modernization jobs, American-Standard provides a wide variety of promotional material, including imprinted direct mail literature and cooperative newspaper advertising. Ask your wholesale distributor about the American-Standard Better Retailing Plan.

Good looking!

Compactly designed! *Precision engineered!*

THE OPEN VIEW of the Seneca above shows the compact design of the unit's construction features. The sturdy steel jacket is easily assembled by means of strong slip joints. Jacket is protected inside with corrosive-resistant high temperature aluminum paint. The heating element is made of durable, corrosion resistant copper bearing steel welded into an integral unit. Large heating surfaces are arranged to eliminate "hot" and "cold" spots, resulting in greater efficiency and longer life. Correctly placed baffles divert hot gases to sides of element, heating entire element uniformly. The blower assembly floats on resilient mounting for quietness. Large oil reservoirs on self-aligning bearings assure long bearing life with minimum attention. Individual controls are the finest available. Burner is of cast iron with patented high temperature alloy ribbons.



Note the welded construction and extensive heating surface of the Seneca's heating element.

The Seneca's dependable cast iron burner, with patented multiple high temperature alloy corrugated ribbons, assures economical operation.

American Radiator & Standard Sanitary Corporation
P. O. Box 1226, Pittsburgh 30, Pa.

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Mutual butane-propane liquid vaporizer burner

EVAPORATORS • WEED BURNERS

MELTING COMPOUNDS • DEHYDRATION

KILNS • DRIERS • ROAD OIL EQUIPMENT

REPLACEMENT FOR OIL - FIRED BURNERS

Here is a simple, fool-proof Butane-Propane burner which utilizes liquid direct from the tank. It is a *self-generating liquid vaporizer burner* and is easily adaptable to dozens of medium and heavy duty industrial uses. This Mutual Liquid Vaporizer, long proven in field use, is available in two sizes, the 2 inch and the 6 inch with output capacities up to 3,500,000 B.T.U./Hr.

Liquid LP-Gas (Butane-Propane), controlled by needle valve illustrated in the photos, first passes into a jacketted chamber surrounding the burner head for the purpose of pre-heating and vaporization. Gaseous Butane-Propane from the vaporizing chamber is then diverted to the gas-air mixer within the burner. A needle valve adjustment controls the flow of gas for best combustible mixtures. No additional vaporizer is required. Close temperature control can be accomplished by using automatic control devices which are readily available on the market.

The Mutual Liquid Vaporizer Burner is a compact, extremely rugged piece of equipment with no moving parts. Construction throughout is highest quality in keeping with all Mutual products. When ordering or requesting information, please state the kind of service, the maximum B.T.U. output required and fuel to be used. (Butane or Propane).

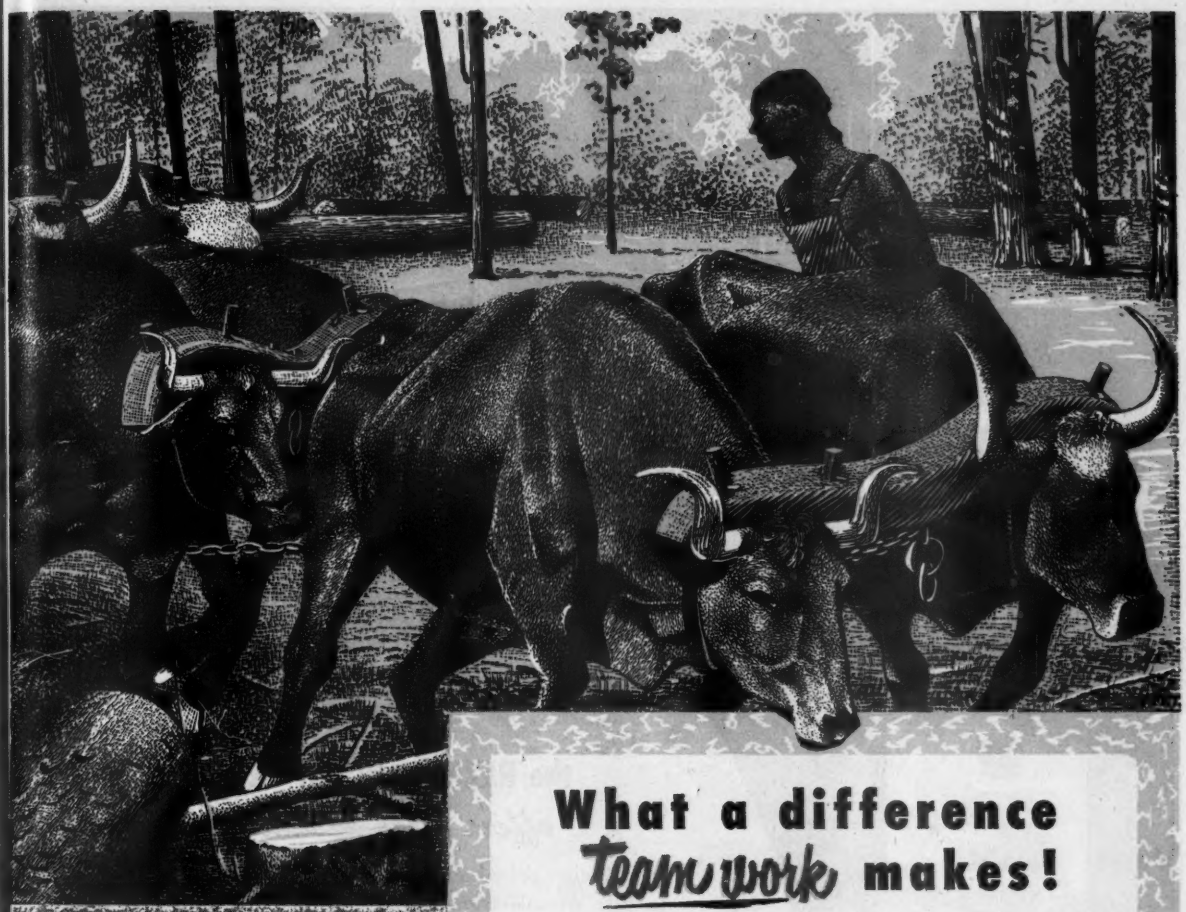
	MODEL LVB2	MODEL LVB6
Rated Consumption	3 gal./hr.	45 gal./hr.
Rated Capacity	280,000 BTU/hr.	3,500,000 BTU/hr.
Size of burner head (I.D.)	2"	6"
Overall length	*25"	36"
Weight	7#	65#
Approx. shipping weight	8#	80#

*May be had in any desired length. Specify size on application.

Mutual

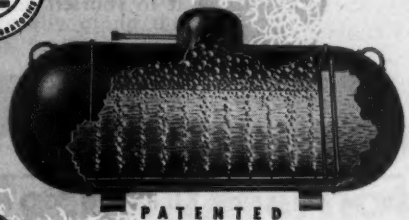
LIQUID GAS EQUIPMENT CO., INC.

3600 WEST IMPERIAL HIGHWAY
INGLEWOOD, CALIFORNIA



What a difference *teamwork* makes!

DELTA MIX-O-GAS SYSTEMS



"Deep in the swamps, where heavy machines bog down, an ox team is often the logger's only answer. When these powerful beasts lower their heads, surge forward against their yokes, and draw the chains taut, something *has* to give! That same sort of teamwork helps produce the outstanding sales volume which features Mix-O-Gas Systems. Aggressive salesmanship of Mix-O-Gas Dealers is backed by the power of Delta's carefully planned advertising. This includes a full program of consumer advertising in newspapers, radio, billboards, direct mail and other proved media. Results of our mutual effort show what a difference real teamwork makes.

We'll do our part to keep the ball rolling, and we know we can always rely on the finest group of dealers in America—those who sell Mix-O-Gas Systems!

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25,000 to 75,000 BTU

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central heating units can now get
central heating performance
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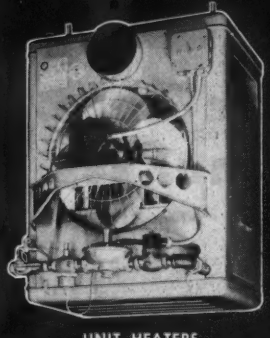
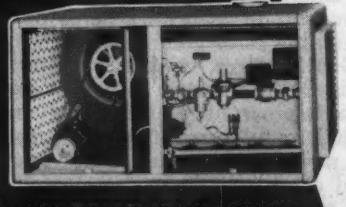


UNIT HEATERS
US-F and US-B Series
25,000 to 200,000 BTU



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- There's the *wall-mount* fuel saver thermostat and a host of other features that make Reznor Heaters more saleable, more serviceable and more profitable for you!
- Since 1888, Reznor has been the leading producer of gas-fired unit heaters. You owe it to yourself and your customers to find out why.

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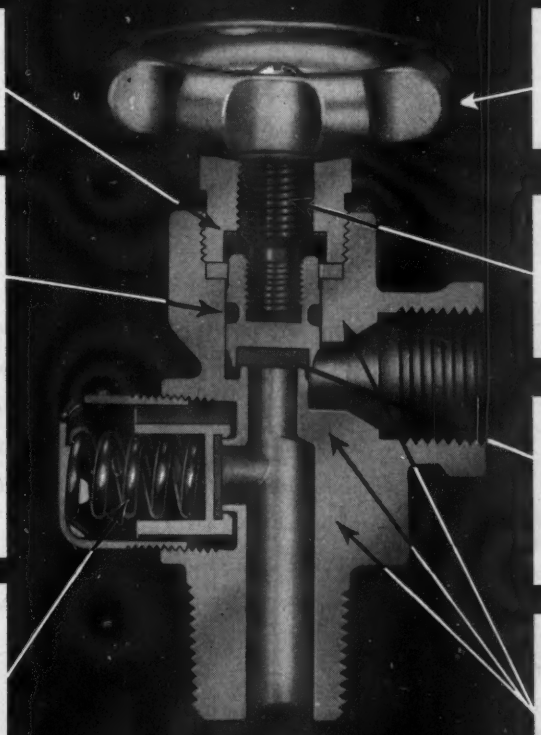
"Built-in Quality makes a BIG Difference"

Pacific **L. P. gas Valves** were developed by engineers who have been designing valves for 20 years. This vast experience has enabled us to eliminate the weaknesses common in valves of older design and to produce an up-to-date valve embodying major improvements which greatly increase valve life and operating efficiency . . . ***Check These Features*** —

Back-Seating Washer of soft copper gives the added safety of an extra seal when valve is fully opened.

"Floating" O-Ring Seal moves freely in a mirror-smooth barrel and is practically frictionless even under full tank pressure. Valve operates with a minimum of effort—a feature your "90 pound housewife" customers will appreciate. In valves of conventional design, broken seals are caused by seat inserts becoming grooved. Pacific's "floating" seal design eliminates this trouble.

Safety Relief Device has "POP" action and is factory set, tested and sealed. Tamper-Proof Safety Cap threads into valve body and is held firmly in place with a pin set laterally along the threads.



Handwheel of modern, huskier design is made of strong die-cast aluminum—easier to grip and easier to use.

Stem is precision machined and dual-threaded for faster operation. Valve may be fully opened or fully closed in approximately 1¼ turns.

"High-lift" Valve Seat provides larger opening for full fuel flow and more rapid filling. Improved seat insert of linen-backed phenolic plastic assures longer life and positive seal.

Valve Body is press forged and reinforced at all points of stress with plenty of metal at base of the outlet for refacing. Extra large wrench flats are provided for ease of installation and removal.

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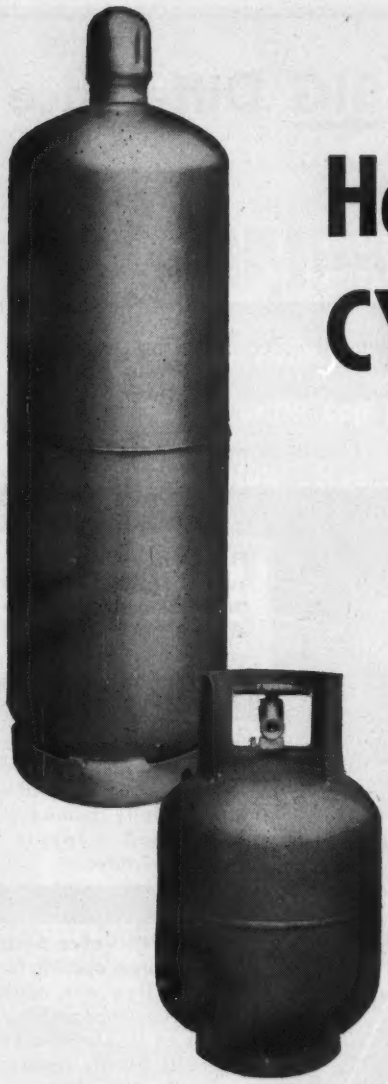

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Compare feature for feature and you'll decide to use PREST-O-LITE cylinders for liquefied petroleum gases—they are unquestionably the No. 1 quality cylinder. Sturdy PREST-O-LITE cylinders lead the field because of their longer service life, light weight, uniformity of wall thickness, and superior design. They're backed by over 35 years of experience and skill in the development, manufacture and use of compressed gas cylinders. You get the greatest overall saving from the best cylinders.

Available in the popular 20-lb., 40-lb., 60-lb., and 100-lb. sizes, with or without valves. Other sizes or styles can be easily made to your specifications. And the crevice-free, ventilated foot ring practically eliminates corrosion around the bottom of the cylinder. PREST-O-LITE cylinders not only meet I.C.C. Specification 4BA-240—they undergo many additional rigid tests far beyond minimum requirements, such as testing for leaks with dry air after the hydrostatic tests.

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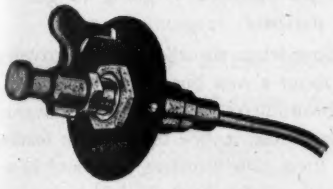
1¼" Liquid Fill Valve with double back check.

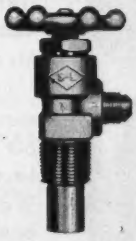
No. 712
¾" Vapor Return Valve. Back check with excess flow check.

No. 650
¾" Liquid Fill Valve with double back check.

No. P-431
¾" Safety Relief Valve.



No. 1
¾" Rotary Gauge.



No. 1445-B
¾" Service Valve for liquid and vapor withdrawal.

No. 10B-D
¼" Fixed Liquid Level Gauge.

Pipe-away Adaptor for No. 445 and 455 Safety Relief Valves.

Internal Relief Valve with Rain Cap.

Internal Type Relief Valve No. 445 - 1" and No. 455 - 1¼".

No. 640
1¼" Liquid Fill Valve with double back check for direct connection to Hose Nozzle.

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The most modern, most complete line of LP-Gas equipment for motor fuel tanks

Here at Selwyn-Landers you can obtain from one source every fitting required for LP-Gas engine fuel tanks. This means one central responsibility for product performance and service. We were among the first to concentrate in the LP-Gas automotive field and the benefit of this experience is built into every S-L product. Through the years we have learned much regarding your particular problems of installation and application. Please feel free to call on us.

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SELWYN-LANDERS COMPANY

S-L

4709 East Washington Blvd., Los Angeles 22, Calif.

"The Honeywell Chronotherm helps us sell the whole heating job!"

says Joe Quackenbush, well-known Paterson, New Jersey, heating contractor

Joe Quackenbush, left, talking to Honeywell Salesman Jim Tapkas

"By stopping and analyzing each sale afterwards, we found that more often than not the Honeywell Chronotherm helped us clinch the *entire sale.*

"Time and again it has helped us sell the boiler, the burner, the pipes – the whole installation.

"We figure this is because, as the brain of the entire heating plant, the Chronotherm sort of *symbolizes* all the work-saving, automatic advantages the customer is going to get with his new purchase.

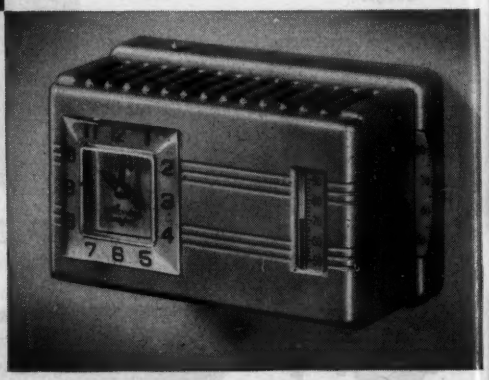
"So now, when we talk to prospective customers about a new burner, we always bring out a Chronotherm. We take off the cover and let them handle it. We explain the features. We tell them how sensitive it is, and how it brings extra comfort to their daily living; how it 'gets up' before they do, early in the morning, and warms the house. And, of course, how it *more than pays* for itself in the long run by saving fuel money.

"Home owners are not only interested – they're downright enthusiastic. Sale of the entire job is made easier.

"Today it's a rarity when we *don't* sell a Honeywell Chronotherm with nearly every job we put in. And, over a year's time, the extra profit is mighty worth while."

Sell the famous Honeywell Chronotherm!

Latest surveys show that 3 out of every 4 families with thermostats raise and lower temperature settings every day, *by hand.* This represents a big potential market for any dealer who sells the Chronotherm; the Chronotherm *automatically* raises temperature in the morning, *automatically* lowers it at night, besides saving fuel! For full facts about the Chronotherm, and other quality Honeywell heating controls, call your local Honeywell office. Or write today to Honeywell, Dept. BN-1-98, Minneapolis 8, Minnesota.



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First in Controls

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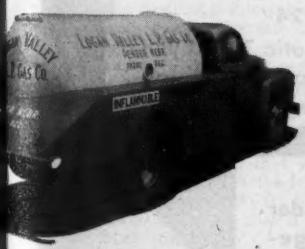
MEMO: To All LP-Gas Dealers

RE: More Profitable Operation

More Butler LP-Gas Transportation Equipment is in use today than any other make.

Here's Why: LP-Gas operators know they can increase the efficiency of their operation with Butler Transports. They depend on better-built Butler LP-Gas Transports because advanced engineering and quality construction offer these advantages:

1. Bigger payloads 2. Less down time 3. Easier maintenance 4. Greater maneuverability 5. Better appearance 6. Safer service 7. Faster loading and unloading



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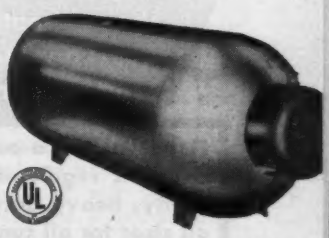
BUTLER ADVANCED DESIGN LP-GAS TRUCK TANKS

BUTLER *BlueBelle*® HOME GAS SYSTEMS



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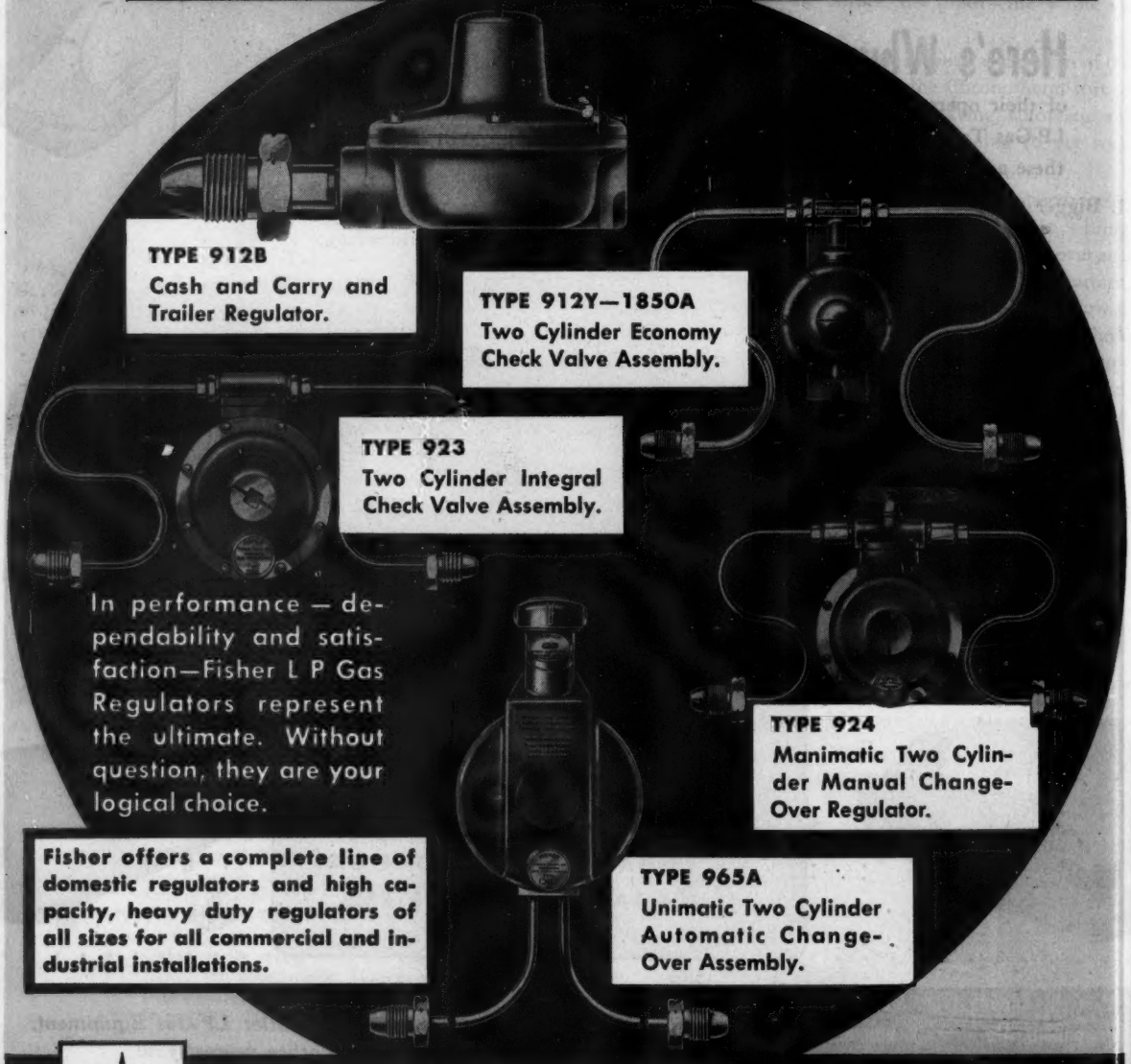
AND RELIABILITY IS A MUST...

FISHER Big Five

L. P. G. REGULATORS



TYPE 912B
Cash and Carry and Trailer Regulator.

TYPE 912Y—1850A
Two Cylinder Economy Check Valve Assembly.

TYPE 923
Two Cylinder Integral Check Valve Assembly.

In performance — dependability and satisfaction—Fisher L P Gas Regulators represent the ultimate. Without question, they are your logical choice.

TYPE 924
Manimatic Two Cylinder Manual Change-Over Regulator.

Fisher offers a complete line of domestic regulators and high capacity, heavy duty regulators of all sizes for all commercial and industrial installations.

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Unimatic Two Cylinder Automatic Change-Over Assembly.

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FOR BETTER GAS PRESSURE CONTROL

LETTERS

BPN
Headquarters
for L.P. gas Information
Since 1931

Rotterdam, Netherlands

We are writing you regarding a problem of calculating the batch vaporization of an underground storage tank for propane.

The tank will be buried about 2½ feet below the surface. The maximum load will be approximately 1,250,000 Btu per hour, during two hours each day.

Please can you give us a figure for heat transport. Dimensions of tank are 2600 gals. capacity by 380 sq. ft. surface, coated with three layers of asphalt-bitume.

N.V.P.

Only about .5 Btu heat transfer rate per °F temperature difference per square foot of total tank area per hour is considered safe for calculating underground storage tank vaporizing capacities. The reason for this lower rate of heat transfer (for aboveground tanks 2 Btu per hour per °F temperature difference is considered safe) is the poor heat transfer or conductance through the surrounding soil.

If the heat demand is too great and the temperature of the soil surrounding the tank falls below freezing, the water in the soil freezes and further reduces the rate of heat transfer to the tank. However, these transfer rates are for steady load demand. If the demand is intermittent and for short periods only, the rate of draw may be safely doubled or even tripled over that calculated for steady service.

You did not advise us in your letter what the lowest soil temperature might be in the winter time. Let us assume, that in burying the tank 2½ ft. below the surface of the ground, that you are below the frost line. In case the frost line in the area is lower than 2½ ft., the tank should be placed deeper so that it will be below the frost line.

Now let us assume that the temperature of the soil surrounding the tank will average 40° F (it may be higher). This means that only 8° F (40° - 32°) temperature difference is available to flow heat from the soil to the tank. Then, since there are 380 sq. ft. of tank surface, the calculated heat transfer into the fuel tank is 380 x 8 x .5 = 1520 Btu per hour. At 350° it requires 162 Btu to vaporize one pound of pure propane. The heating value of propane is 21,690 Btu per pound, so it will require 1,250,000 ÷ 21,690 = 5.76 lbs. per hour. Therefore, it requires that 5.76 x 162 = 934 Btu per hour be transferred from the soil to the tank to maintain your load. Your tank could safely handle the vaporization of about 1520 ÷ 162 = 9.4 lbs. per hour on a steady demand basis. Your tank is adequate for the load you anticipate. —Ed.

•

California

I have a walnut dehydrator with a fan 10″ x 18″ driven at 1800 rpm.

Now the air must be warmed up from approximately 50° to a maximum of 110°.

Can you tell me approximately the number of Btu's per hour required to raise the temperature to 110°?

I.R.

The information which you have included on the dehydrator fan is insufficient for us to determine its exact capacity. You can obtain the capacity of the fan from the manufacturer by writing to them or their authorized agent and including the fan type, model, size and serial number. Also the elevation above sea level at which the fan will be operated should be included.

However, the following data and illustration should enable you to calculate the heat required when you obtain the fan capacity. The following example is based on heating 1000 cu. ft. of air per minute from 50° F to 110° F.

The heat capacity of air, like all gases, varies with change in temperature, but for the range from 50° F to 150° F, .0184 Btu per cu. ft. per degree F is about average. Therefore, 1000 cu ft./min. x 60 min./hr. x (110° F — 50° F) temperature rise x .0184 heat capacity per cu. ft. per degree F = 66,240 Btu per hour. This figure multiplied by the fan capacity in thousands of cu. ft. will give the quantity of heat required per hour to raise the air temperature from 50° F to 110° F.

The calculated heat required in the above paragraph represents the actual amount needed to raise the temperature of the air from 50° F to 110° F. It does not take into account the radiation losses of the combustion chamber, radiation losses from the duct work through which the heated air is conducted to the drier or other items of heat loss. Such losses can be determined only after an inspection and survey of the system. However, we assume the burner used to heat the air will burn and discharge the products of combustion directly into the air stream on the intake side of the fan. In such cases the burner efficiency is high and since radiation losses would be relatively light at the low temperature used, an efficiency of 70% should provide a safe margin. Therefore, 66,240 Btu + .70 = 94,630 Btu per hour input over 1000 cu. ft. air heated per hour should suffice.—Ed.

•

Alberta, Canada

Our company has very recently entered the LPG manufacturing business by buying out the equipment of another independent operator and we are now moving this equipment and reinstalling same in conjunction with our main absorption plant and gas scrubbing operations.

It would appear however that we possibly have a problem in connection with our propane storage and loading-out facilities relationship. We note in most of the articles on this subject in *Butane-Propane News* that the importance of placing the loading-out pump close to the supply tank is stressed.

The attached sketch indicates a set-up that would be most convenient for us; however, the pump certainly is not close to the tanks.

We feel however that the additional head to the pumps might offset the difficulty of gas lock since the lines to the pump would be graded and buried.

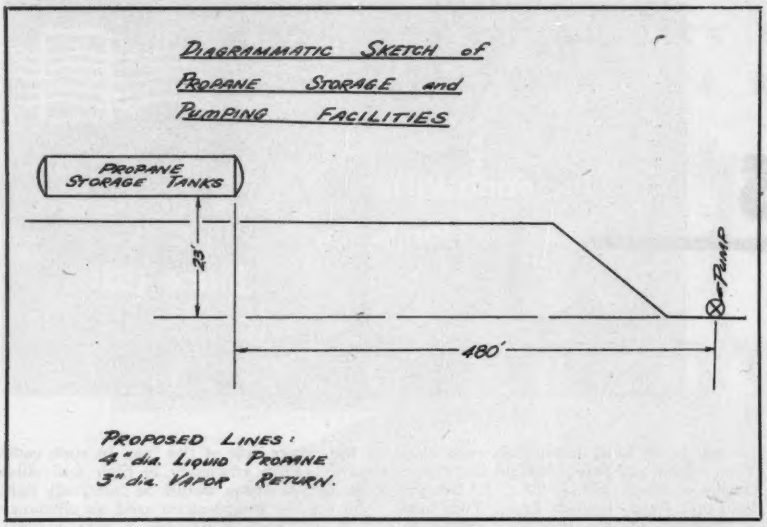
Could we impose on your information service as to whether or not such an installation, or any suggested modification of same, would be satisfactory?

E.S.

The information included in your letter and sketch lack some vital information to make an exact study of your problem. However by making some assumptions it is believed a sample calculation can be made to illustrate a solution to your problem.

The main information lacking is the capacity of the pump, the size openings in the storage tanks and the size and type of valves in the liquid lines.

In the following sample caluculation, it



is assumed the pump has a capacity of 100 gpm. It is also assumed that there is 1 3-in. strainer, 1 3-in. tee, 4 3-in. 90° elbows, 2 3-in. plug type valves, 1 3-in. excess-flow valve in the line.

Refer to the July, 1951, issue of "Butane-Propane News" and the article (page 47) entitled "Transferring L. P. Gas With Liquid Pumps" by Lawrence Smith, of the Smith Precision Products Co. Table 2 lists the resistance to flow of various valves and fittings expressed in feet of pipe. Also Table 1 lists the resistance to flow of several sizes of pipe for various rates of flow.

It will be noted in Table 2 that the 3 in. x 2 in. excess flow valve has an extremely high resistance to flow. Since Mr. Smith prepared Table 2, two manufacturers of L. P. gas equipment have developed excess-flow valves which have much less resistance to flow than the older style. The Bastian-Blessing Co. manufactures the 3 in. Catalog No. 3500 AR which has a resistance equivalent to only 90 ft. of 3-in. pipe. Their 2-in., Catalog No. 3500 AL1 has a resistance of 290 ft. of 3 in. pipe. Kerotest makes the same size valves which have equivalent resistance to flow. The numbers of their valves are P-99X06 for the 3-in. size and P-99X07 for the 2-in. model. Both companies build these valves to close at two or three rates of flow.

The accompanying table is a calculation of resistance to flow in a 3-in. line with several fittings included:

Table 1 indicates that 3-in. pipe has a resistance to flow of .026 ft. of head expressed in feet of flowing fluid. Therefore, .026 x 679 ft. = 17.65 head.

The foregoing indicates that the 4-in. liquid line you propose has ample capacity. A 3-in. line would do very well if the new type excess-flow valve and other conditions are as set forth in preceding paragraphs.

The 4-inch liquid line and large difference in elevation should enable you to transfer fuel from storage to tank cars or trucks at a satisfactory rate without a pump, in which case we suggest the pump be placed in a by-pass loop.—Ed.

•

Kansas

On a job I have two furnaces which are supplied by one 1000-gallon propane tank. The furnaces are a 330,000 and a 440,000 Btu furnace which makes a total of 770,000 Btu on this one tank.

We are now using a high pressure regulator at the tank with a 1-inch line running to the outside of the building. There we have the line teed off for each furnace. For the 440,000 Btu furnace we have two regulators feeding a 2-inch pipe 20 feet long that goes up over the furnace; then a 1¼-inch pipe 7 feet down to the valve upon the furnace.

On the 330,000 Btu furnace we have one regulator feeding a 1¼-inch line 55 feet long to the furnace. This is not at all satisfactory as the pressure will not hold up at the tank and in turn drops at the furnaces, too.

Please advise me as to where I can get a vaporizer that will properly vaporize the gas so as to make the furnaces operate satisfactorily. Also any comment that you may have in regard to regulator set up or pipe sizing on this job will be appreciated.

I have talked to many salesmen but none have been able to tell me much in regards to a vaporizer that will work on this job.

C.B.

You can obtain a suitable vaporizer from one of the following companies:

American Liquid Gas Corp., 1109 So. Santa Fe Ave., Los Angeles, Calif.

Consolidated Gas & Equipment Co. of America, Box 6560, Stockyards Station, Denver, Colo.

John E. Mitchell Co., 3800 Commerce St., Dallas, Texas.

Pipe sizes appear adequate, but we cannot tell about the regulators since you do not specify the make, model or size.

It is suggested that the vaporizer be installed so that it discharges into the 1-inch high pressure gas line some place between the primary and secondary regulators, and that a shutoff valve be placed between the vaporizer and the present high pressure gas line. The regulator on the vaporizer should be set to discharge at a pressure one or two pounds higher than the present high pressure or primary regulator on the storage tank.

Then if the vaporizer should fail, due to pilot light failure or for other reasons, vapor will start to flow from the top of the tank through the present primary regulator and not cause an interruption in the service to the applances. Also, during periods when the weather is mild and the load not too heavy, the vaporizer may be shut off and vapor withdrawn from the top of the tank.—Ed.

•

Minnesota

We would like to know the capacity of a syncromatic wood and coal furnace—Model CF227, Serial 31649.

We want to convert it to L. P. gas.

E.H.

We do not have any information available which will provide data on the "synchromatic" wood and coal furnace to which you refer. We suggest you write directly to the manufacturers of the furnace.

Some of the manufacturers of conversion units may have this information and can recommend the proper size of their units for a satisfactory conversion. However, it is best to survey the house and make a heat loss estimate so that the conversion unit can be properly sized for the job which it must do. The July, 1950, issue of "Butane-Propane News" contains an article entitled "Size Heating Equipment Carefully" by E. G. Johnson, of the Coleman Co., Inc., which explains how such a survey and estimate can be made.—Ed.

TABLE OF RESISTANCE TO FLOW

Fitting	Equivalent Length of 3-In. Schedule 80 Black Pipe		
	No.	Per Fitting	Total
Strainer	1	42 in.	42 ft.
Tees (flow straight through)	1	5 in.	5 ft.
90° elbows	4	8 in.	32 ft.
Plug valves (3 in.)	2	10 in.	20 ft.
3-in. excess flow (new type)	1	90 in.	90 ft.
Length of 3-in. pipe	490		490 ft.
Total equivalent length of 3-in. pipe			679 ft.

"We sell all kinds of heating equipment, but we have never seen anything like COROAIRE!"

says **HUTCHINSON BUTANE CO.**
Hutchinson, Kansas

"I can truthfully say that 9 out of 10 customers of COROAIRE have sold for me at least one more unit."

CUSTOMERS SELL FOR YOU!

"We have sold COROAIRE since 1946. We have installed some 300 units in homes, cafes, churches and stores. We have had practically no complaints or dissatisfied customers. Our service is nil on Coroaire."

EASY TO SELL!

"In a local super-market, a single COROAIRE—85-G Model replaced three 50,000 B.T.U. circulating heaters and did a better heating job . . . also reduced the gas bill from a high of $51.00 a month to only $9.00 per month".

HEATING ECONOMY FOR YOUR CUSTOMERS!

"We sell all kinds of heating equipment, but we have never seen anything like COROAIRE. It is almost unbelievable what it will do. And when customers get their gas bills, they are as enthusiastic as we are".

UNBELIEVABLE PERFORMANCE!

COROAIRE-CONSOLE Model 85-G in burl walnut or silver-gray finish.

"The single model and size makes our inventory problem easy—we always have COROAIRE to sell without a big investment in models and sizes".

SMALLEST INVENTORY!

The above unsolicited quotations show just how easy it is to sell COROAIRE. We'll be glad to send you a copy of the complete letter containing these COROAIRE SELLING POINTS. Just write . . .

THE COROAIRE HEATER CORPORATION

Dept. BP-53 • 1422 Euclid Ave. • Cleveland 15, Ohio

FOR
DEPENDABLE
SERVICE...
28 PLANTS IN
10 STATES . . .
SURE!
Dependable, modern plants . . . uniform quality LP-Gas products, constantly "on spec" . . . trained technical personnel to help with your problems . . .
be SURE — write, wire or call
STANOLIND
Oil and Gas Company
LP GAS SALES SECTION P.O. BOX 591, TULSA, OKLA.
MEMBER
national LP-GAS PROMOTIONAL program

Editorial Comment

THIS JANUARY ISSUE, the first in its 15th year of publication, shows "Butane-Propane News" in new format and portends enlarged service to our readers, thousands of whom have been with us since No. 1 of Vol. 1, back in 1939.

We have progressed together and hope to inspire reader allegiance at all times.

OF PRIMARY INTEREST this month is the recording of historical dates in the industry's development that shows its progress from an idea to one of the great public services of the nation.

There were scores of individuals who contributed to this 48 years of growth to whom specific credit has not been given for want of space, but the principal influencing factors which guided and directed the industry have been set out.

Many will want to keep this record permanently.

ANOTHER FEATURE which is exceedingly timely and which can be utilized by dealers all over the country is a resume of the laws and regulations of various states affecting liquefied petroleum gas operations.

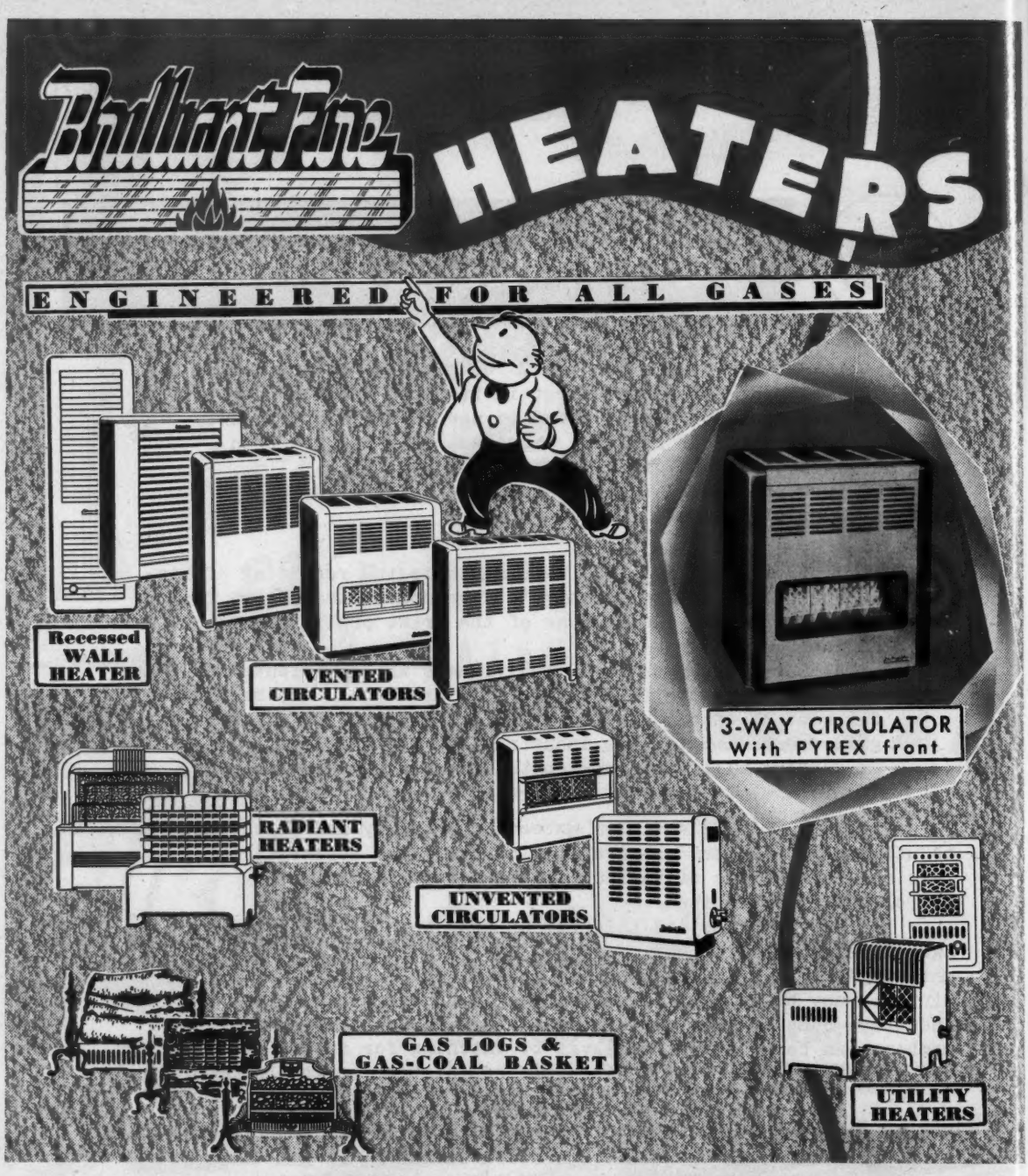
Arthur Kreutzer did this for us once before--five years ago. This month he brings us up to date with the latest information. With legislatures meeting in most of the states this winter, many bills will be introduced in an effort to govern our industry. Some of these will probably not be fair and industry members can best serve themselves by watching for such legislation and reporting it to their state association or to the LPGA.

THERE ARE PROBABLY MORE DIFFICULTIES for operators in fuel transfer than any other operation in the L. P. gas industry. Most trouble is due to lack of information or failure to follow the advice of experts.

One of these experts has a top-notch article in this issue. He is Lawrence W. Smith, who has furnished us with many important articles in the past. The title of his present offering is "How to Speed-Up Fuel Deliveries".

He tells you how small changes in pump discharge lines will save you time and money and sets out operation suggestions which will bring best results. Here is an article that you will want to keep on your desk for a long time to come.

Ed.



THE COMPLETE & POPULAR LINE

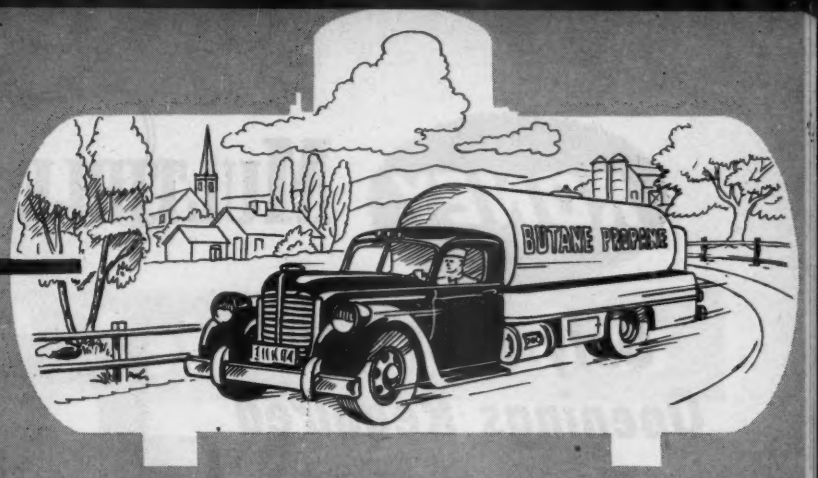
EVERY NEED for modern, efficient heating . . . home, office, store, club, motel, etc. Range from 8,000 to 75,000 Btu. Quality built . . . budget priced . . . thriftwise on fuel. Safe and dependable . . . backed by over a century of engineering know how. Tested and approved . . . for all Gases. Excellent assortment of fresh, colorful Merchandising Helps furnished all franchised dealers.

WRITE FOR CATALOG · PRICES · NEAREST DISTRIBUTOR

THE OHIO FOUNDRY & MANUFACTURING COMPANY

"Quality Heating Equipment Since 1846" . . . . . **STEUBENVILLE, OHIO**

BEYOND THE MAINS



Can the L. P. gas industry be made accident-proof? Next month we will introduce a new and continuing training program to help YOU bring that about.

Accidents Are Bad News

Domestic or industrial accidents arising from careless or uninformed misuse of electrical appliances, or accidental contact with power wires, seem to be regarded as matters of strictly local importance. Perhaps their frequency is such that they no longer rate as news. But let an L. P. gas accident occur, and the major news services carry the notice from coast to coast.

The fact that a recent household explosion in Indiana rated headlines as far away as Los Angeles emphasizes the great importance of safety in every operation in our industry, and in every installation for the utilization of our product.

How safely our industry can conduct its operations under an organized program of safety consciousness is indicated by figures recently disclosed by the Department of Insurance of the state of Kentucky. In a survey conducted by J. T. Underwood, state fire marshal, to which approximately half of the licensed LPG operators in the state have responded, the record shows an average loss due to accidents in the past five years of only 13 cents per customer—2.3¢ per customer per year.

This includes the compensated value of all accidents to employes, accidents in transportation, and accidents due to the use of L. P. gas on customers' premises for all firms included in the survey.

We have seen no headlines concerning this low accident record, except in the bulletin published by the Kentucky LPGA. Safety is not news, but accidents are bad news. Let's not have them.

Psychological Approach

We offer these apparently unrelated facts for what they may be worth. They might relate to the gas business.

Psychologists tell us that, in the care and feeding of romance, compliments are even more important than the cooking. And that, nine times out of ten, Mrs. Jones' husband neglects to tell her, as often as she needs to hear it, that she is really nice looking. Mrs. Jones is emotionally undernourished.

Display specialists tell us that the most effective way to show your most desirable CP range is to place it in a well illuminated spot, uncrowded by other merchandise, and where it will be exposed to maximum traffic flow. On the main aisle, between the front door and the counter where the monthly bills are paid, is an excellent location.

Specialists in sales psychology tell us that if a large mirror is placed directly behind the above mentioned range, almost every woman who passes will stop to see how the range works.

So Mrs. Jones will pause, and in so doing she will be impressed with what Mr. Jones has been missing — that an attractive range enhances her own loveliness. The urge to bring this important discovery to the attention of Mr. Jones may become irresistible.

Your services in making it possible for Mr. Jones to see Mrs. Jones every day against this attractive background will help Mr. Jones to remember the need for providing the necessary emotional nourishment for Mrs. Jones.

It may also help you to meet your next note at Mr. Jones' bank.

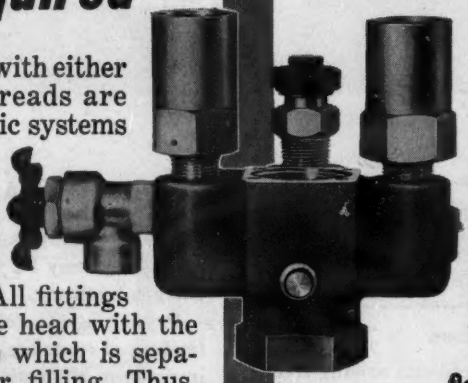
Earl Abell

RONEY

MULTIPLE VALVE UNITS

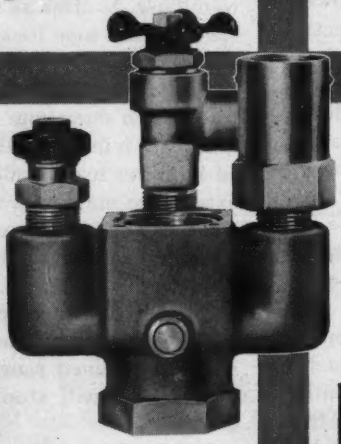
Only Two Tank Openings Required

Roney Multiple Valve Units with either 2" male or 1½" female threads are available for all type domestic systems (above or below ground) in a number of variations. Units with female threads feature the new hexagonal base to provide wrenching area for easy installation. All fittings are mounted in the multiple head with the exception of the filler valve which is separately mounted for faster filling, Thus, *a total of only two openings in the tank* are required.



1274

Roney 1274 (illustrated) is complete with two relief valves, combination vapor return and excess flow valve, shut-off valve, 10% valve and dip tube, and machined opening for senior size float gauge. Available with or without pressure gauge.



1273

Roney 1273 unit has one relief valve, a combination vapor return and excess flow valve, regular shut-off line valve. Available with or without pressure gauge and 10% tube.

All units are listed by Underwriters' Laboratories, Inc., and are 100% pressure tested before shipped. Because all valves are individually replaceable without entire head removal, greatly simplified field service is made possible.

INSTRUCTIONS FOR ORDERING

State dimensions of tank or DxU required. Also whether above or below ground type. Be sure to advise if 10% outage gauge and/or pressure gauge required.

Valves individually replaceable!

RONEY inc. 105 COLE STREET, DALLAS, TEXAS

EQUIPMENT AVAILABLE FOR IMMEDIATE SHIPMENT

Liquefied Petroleum Gas

48

YEARS OLD

BPN

THE birth of the liquefied petroleum gas industry in 1904 was too insignificant historically to be recorded on the passing record of Time, but in the half-century that followed it had such phenomonal growth and brought so many economic and personal benefits to the peoples in rural areas of this country, and elsewhere in the world, it truly may be said a destiny awaited it from the very beginning—and that a large measure of such destiny has been attained by this new year of 1953.

That other heights lie ahead, there is no doubt!

1904 | 1928

IN THE BEGINNING..

Herman Blau, original developer of "Blaugas" in Germany in 1904, which was the forerunner of liquefied petroleum gas and was later brought to America.

Walter O. Snelling, explosive specialist of the U. S. Bureau of Standards, who was prominent in the early history of the industry. He helped form first company.

A. N. Kerr, generally recognized as the "father of the liquefied petroleum gas industry," whose experiments and research started LPG to market.

BOTTLED gas is now 48 years old—almost half-a-century!

Its history began in 1904, in Augsburg, Germany, with the development of "Blaugas" by Herman Blau, a young German chemist. The product was a mixture of permanent gases, liquid gas, and light fractions of gasoline, all synthetically produced by a modification of the prevalent practice of manufacturing illuminating gas from oil.

Blaugas was expensive to produce, and even more expensive to handle. It was stored in cylinders, in which the pressures ranged from 750 to 1500 psi. The cost of manufacture was roughly 10¢ per lb., and the users had to pay two-way freight on 7 lb. of steel to get 1 lb. of fuel.

The utilization "system" consisted of a gas-fired vaporizer, a series of liquid and vapor regulators to reduce tank pressure to 8 oz., and a small storage tank to hold the prepared vapor. The same equipment introduced into America carried an installation charge of $200, even back in the days when a dollar would buy a lot.

First Used for Street Lighting

Blaugas was used for lighting streets and homes, and for domestic cooking. It achieved moderate popularity among the Europeans who could afford it, and plants were later installed in several countries in Europe. Nine American companies were formed to market the product in this country, two of which, the Northwestern Blaugas Co., St. Paul, Minn., and Blaugas Co., Omaha, Neb., survived through the adoption of L. P. gas when it became available.

Liquefied petroleum gases, as we know them now, came into being through the investigations and experimental efforts of several workers of unusual vision in the petroleum and related fields. Technical Paper No. 10 of the U. S. Bureau of Mines, published in 1912, and written by Irving C. Allen and George A. Burrell (now president of Atlantic States Gas Co.) notes that the liquid condensing out of natural gas in pipe lines contained ingredients of gaseous nature which should have commercial possibilities.

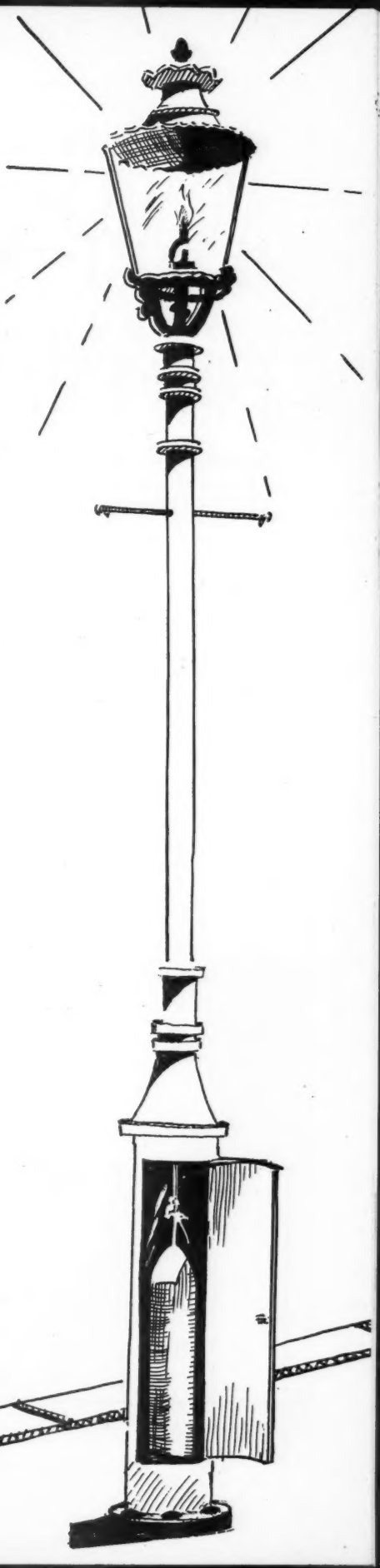
During two or three years prior to the publication of this report, Dr. Walter O. Snelling, an explosives specialist for the Bureau of Standards, was working on the production and utilization of these same gaseous components. As early as May, 1912, he had developed a workable system of storing the liquefied gaseous extract of this pipeline "drip gasoline" in steel cylinders, and installing the gas systems in rural homes for lighting and heating. His description of the merits of the product, as revealed in newspaper accounts of that period, sound strangely like the product story which we use today.

A. N. Kerr Enters Field

At about this same time C. L. Kerr and his cousin, A. N. Kerr, who later founded the Rockgas Products Co. of Pittsburgh, Pa., and the Imperial Gas Co., of Long Beach, Calif., produced a similar material by re-condensing the vapors which escaped during the weathering of natural gasoline at their Riverside Oil Co. refinery at Sisterville, W. Va. Mr. Snelling and the Kerrs formed the American Gasol Co., the first company organized to bottle and sell liquefied gas extracted from natural gas and natural gasoline.

Their product was called "Gasol". They had not yet found out how to fractionate it properly, and so much heavy material was included in the first season's output that they experienced difficulty vaporizing it during cold weather.

This problem was overcome in a short time by securing raw stock with a more favorable boiling range from another source, and by developing equipment which enabled them to make a product which was more predominantly butane and propane. It still contained considerable ethane, and the required storage pressure was so high that very heavy steel cylinders were required to hold it.



The Pittsburgh Sunday Post, September 8, 1912.

The Pittsburgh Sunday Post Feature Section

LIQUID GAS MADE BY MODERN PROMETHEUS

Discovery by Dr. Walter O. Snelling Rivals in Some Respects Fabled Theft of Fire From Mount Olympus by Titan—Has Many Uses and Advantages.

Dr. Walter O. Snelling, who has discovered a way of making a practical liquid gas.

The first house in the world to be lighted with liquid gas. A farm house near Pittsburgh, lighted by Dr. Snelling's apparatus. Liquid gas bottle in use.

House all lighted by the bottle and pipeline system.

Liquid gas plant in a suitcase—This is a photograph of the suitcase that Dr. Snelling carried to Washington for demonstration while applying for patents.

Liquid Gas bottle carried for shipment.

LIQUID GAS

Is made from the waste from natural gas gasoline, and from the gases that now go to waste in the oil fields to the aggregate of 300,000,000 cubic feet a day.

Has four times the heating capacity of coal gas.

Gives a brighter flame than any other gas in a Welsbach burner.

Has a flame temperature in air of 2,500 degrees. That of natural gas is 2,150 degrees.

Makes it possible for folks to have gas wherever a 125-pound steel container can be carried.

Can be manufactured to sell at 6c for the equivalent of [illegible]

By RAYMOND EVANS.

WRITTEN EXCLUSIVELY FOR THE POST.

I WENT out to the Arsenal grounds expecting to see a dyed-in-the-wool scientist with a horizon circumscribed by a little ring of retorts and crucibles. I found a sort of modern Prometheus, with a horizon as wide as the circle of the farthest fixed stars.

I found a young expert in high explosives who dreams light—who has a vision of a torch as bright as the sun. Not that he hopes ever to achieve the fabrication of such a torch. But he does propose to bring to mankind a flame just as closely approximating sunlight in its effect as it is possible for man to secure.

To this end he has scaled the Olympus of natural mysteries and has brought down thence a "gas" torch by way of a beginning.

With good he hopes to keep the boys from leaving the farm.

This is in no sense a joke. That really seems to be the high goal of his endeavors. He is profoundly interested in farms and farm folks. He knows farm folks and he knows the life they like. He thinks they are the salt of the earth and he would like to see them stay where they belong and be happy there. And he believes that light will do the trick.

He has come to the conclusion that there is a real and significant relation between illumination and human happiness—that people inevitably drift toward the brightest light because they feel happier there. He believes that the drift from the country to the city is in large measure due to the superior lighting of the cities at night.

In short, he believes that for country folks, the answer to the question of why boys leave home (and girls too, for that matter) is simply: THE KEROSENE LAMP.

And so he has gone about it to put the kerosene lamp in the shade and out of business—to give farm folks a bright, safe and convenient light at a reasonable cost. The result of his endeavor has been the discovery of a way of making an easily transportable liquid gas out of the waste gases of the gas and oil fields.

This liquid gas, which its discoverer has named "pentl" has four times the heating capacity of coal gas, and gives a much brighter light than either coal gas or natural gas.

It is made out of the waste from natural gas gasoline and of the heavy oil well gases, of which it is estimated that more than five hundred million cubic feet go to waste in this country every day.

The pentl industry will be developed in Pittsburgh. The latter day Prometheus is a young man named Dr. Walter O. Snelling, consulting chemist for the local laboratories of the Federal bureau of mines, Pittsburgh capital is to back his enterprise.

I FOUND Dr. Snelling in his office in one of the old Arsenal buildings, surrounded by row-inspiring rows of bottles filled with divers dread explosives. To leave the imagination among these vials of concentrated potentialities was one's sixth pastime and cause. What horror might not those innocent looking ultra portents wreak! This grim family of picrates and picrites, yellow, crystalline powders, first cousins to lyddite and ammonite, imprisoned in a dozen or more little wide-mouthed bottles all sitting in a row—what sudden devastation might not these spread at the slightest disturbance of their calm balances?

"How," I said to myself, when the doctor proudly introduced me to this amusing brother of cults, "can I know just why the suitable and entertaining chemist from the motor laboratory was so kindly accidentee in hauling my company while I waited here for the matter of them past powers to appear."

And I shuddered to think what might have happened if I had blundered among them bottled destroyers, all eclipses in contained explosion, and had dropped something.

But it is bottled gas, and not bottled picrates, that especially concerns Dr. Snelling just now. So he promptly displayed to me the result of his most recent experiments in bottling power.

The bottles in which he hopefully sells his liquid gas are very different from those in which he houses his picrates. The gas bottles are about five feet long and perhaps eight inches in diameter, and they are made of fine steel. One weighs nearly a hundred pounds. They are fitted for holding a liquid that wants to be a gas to the tune of a pressure of several hundred pounds to the square inch.

MAKES BRILLIANT LIGHT.

Dr. Snelling took one of these bottles, attached it to a pipe carrying a series of Welsbach burners, turned a cock and lighted the burners. They burned more brilliantly than if fed by the best artificial gas. He turned the gas into a blue flame burner, a modern modification of the Bunsen burner, and it burned with a pale blue flame that gave off intense heat.

Then he took me to another bottle and turned the valve over so little, the gas escaped with a loud hiss. It looked like the vapor of escaping steam, but it was intensely cold. The cool was ice cold in a few seconds.

"Efforts to condense natural gas," said the inventor, "as so to make it available for use in isolated places where pipe lines never go, have failed because natural gas doesn't liquefy under a pressure low enough to me it available. There are gases over, that liquefy under very low pressure. Such a gases that we find dissolved in gasoline that is made by the compression process. Such a gas is pentl, and by 'selling' out of and greatly enhancing the explosion. It is from we have made this it

Then he went on of liquid gas. P

Since the last gas pipe lines, believed to ad ering of a liqu used to supply farmhouses, and then he is giving quite a thorough tryout before taking up the matter of putting the liquid gas on the market. Then for it has many important experiments Dr. Snelling is constantly receiving letters from neighbors of those who are using the gas, urging him to hurry and put his bottled gas on the market. They want it.

"I have always held," says the inventor, "that if a thing has merit it will be heard of its own accord after it has had just a little initial pushing. I think the demand created for pentl by the example of the few plants we have installed experimentally proves that folks want liquid gas."

A SIMPLE PLANT.

The "plant" is simply an oblong box set up some place outside the house and sheltering two steel bottles (one for present use and one in reserve) and a pressure tank fitted with valves for reducing the pressure of the gas. The house is piped for lights and stoves [illegible] ideal light. So when folks get a taste of the new light, many times brighter than the light of the oil lamps they have been accustomed to, they are never content to return to the comparative gloom of the old form of illumination.

"Why, now I can see to read way over here in the corner," one farmhand said to me. He was simply overjoyed. I truly believe that when all farmhouses are so lighted that folks can see to read 'in the corner,' there will be no occasion for farmers to complain that their boys are leaving the farm for the city.

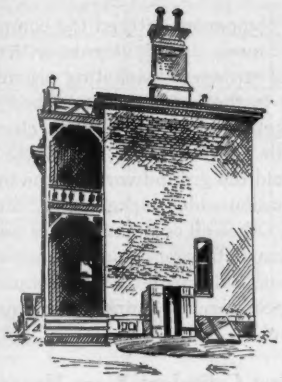
"I'm perfectly serious in saying that. Human beings go where the brightest light is. The best lighted street draws the most people; the best lighted store gets the most trade. And the best lighted farmhouse is the one that is most likely to hold the [illegible] that have been used under

[illegible] of the

HOW WIRELESS WORKS

Principle of It Is Easily Comprehended by the Novice.

It is quite impossible to describe the details of a wireless station so that a novice will understand, but the principle of the thing is easily comprehended. A wireless station is known by masts, whose number and size are determined. There are two wires put up in every station, which is a network consisting of from one to [illegible] wires. The [illegible] is divided, primary and secondary. The primary is the one which is known to the world as the wireless station. In it [illegible] are placed the instruments which receive and send out the electric impulses which [illegible] the air. The secondary circuit is the one within [illegible] and is connected with the primary by induction. It was the honorable Prof. Tesla who discovered that electricity, like light and heat, when sent in waves would [illegible] Just precisely how these waves [illegible] the phenomenon is not as yet fully understood, but it is believed to [illegible] [illegible] [illegible]



The first domestic L. P. gas installation, at the home of John Gahling, Waterford, Pa.

While the product proved to be a practical fuel, with many advantages over oil and natural gas, it was not possible to merchandise it widely at that time, because of the great weight of the containers. Its domestic use was confined to lighting and cooking in homes closely surrounding the production plant. The first homes in which installations of the new gas were made were in the vicinity of Waterford and Le Boef, Pa., in the spring of 1912.

Of invaluable technical assistance during this early period was the work of Frank R. Peterson, an associate of the Kerrs, who was engaged in developing improved equipment for processing natural gasoline. In 1911 he filed a patent application covering the first practical method of obtaining the liquefied petroleum gas fractions in quantities, direct from natural gas. His process segregated the heavier ingredients of the gas into stable natural gasoline, highly volatile gasoline blending stock, and liquefiable petroleum gases consisting of butane, isobutane, propane and a small quantity of ethane.

With uncanny foresight, the list of uses included in the patent application included illumination, fuel for operating gas engines, welding, brazing, cutting metals, and in surgery as an anesthetic.

Before Mr. Peterson had been issued his patent he had an experimental automobile operating on the streets of New York City which used a mixture of butane and propane for fuel.

In the summer of 1911, J. F. Richardson had applied the gas commercially to the cutting of steel in the Pittsburgh area, where it later became extensively used for cutting billets and removing the risers from large castings. This became the principal use for liquefied petroleum gas until 1920, at which time the Rockgas Products Co., owned by the Kerr interests, the Pittsburgh Thermoline Co., and the Hope Natural Gas Co., were competing for the available business.

At this time the Union Carbide Co., manufacturers of "Presto-Lite," which was losing ground to the new product in the cutting field, built a plant at Clendenning, W. Va., and brought out "Pyrofax" for cooking, and "Pyrogene" for cutting.

Their research resulted in the development of the column still, which they called a "stabilizer", in which production costs of the fuels were drastically reduced. This company made its own cylinders at Indianapolis.

With all of these advantages, and using the nation-wide Presto-Lite marketing organization, Pyrofax made substantial progress, although the early years were not noticeably profitable on account of the high development costs, and the expense of pioneering in the merchandising of domestic fuel.

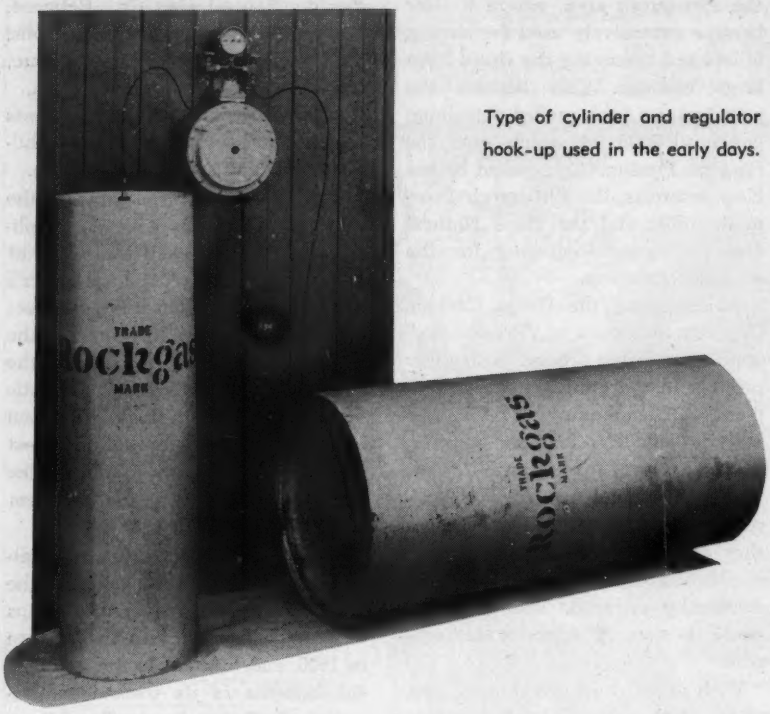
Other companies identified with the early distribution of L.P. gas included Protane Corp., Pennsylvania; Fuelite Natural Gas Co., Belmont, Mass.; McNay Gas Co., Corapolis, Pa.; Nugas Corp., Greenwich, Conn., and Superfuel of Florida, Tampa.

Among the first bottling plants were ones in Hudson, Ohio (Phillips), St. Paul, Omaha and Tampa.

Through this early period, the customer "systems" were complicated and expensive. It was not until 1925 that "Andy" (Arthur N.) Kerr's Imperial Gas Co., which had been set up in California as a branch of the Rockgas Products Co., built up the first successful tank-vapor domestic system, utilizing a single tank and one regulator. This brought the cost of installation down to match the cost of the product, and progress went ahead in high gear.

The growing business began to attract the attention of some of the larger gasoline producers. Phillips Petroleum Co. got into the picture in 1926, and brought to the industry the benefits of its tremendous research facilities. Its traffic department was also of inestimable service in securing favorable freight rates, and in conjuction with other departments of the company was able to develop and secure approval of suitable tank cars and other shipping facilities. Its marketing department pioneered in the leasing of sets, selling their product under the trade name of "Philgas."

Base of A. N. Kerr's early experiments, the casinghead gasoline plant in Noble, Pa.



Type of cylinder and regulator hook-up used in the early days.

Development of the tank car by Phillips quickly brought to the infant L.P. gas industry—in 1927—these first tank car size installations: Domestic bottling plant in Hudson, Ohio; industrial at Detroit, Mich.; utility gas enrichment at Muscatine, Iowa; and utility butane-air at Linton, Ind. Each of these was the first of its type in the L.P. gas industry, each was engineered and served by Phillips Petroleum Co.

The first commercial use of an L.P. gas tank truck and domestic installation served by tank truck occurred in 1928 at Phillips Petroleum Co.'s Pontiac, Mich., district. A subsequent "first" by Phillips in the domestic field was the "Self-Service" cash-and-carry type system, commercially introduced in 1934.

Skelly Oil Co. appeared on the scene in a short time, with "Skelgas". A marketing and warehouse system was set up to cover the "breadbasket" states. They were the first to make LPG out of the gases from cracking stills used in gasoline production, a development which increased the available supply of fuel at very low expense.

By 1928 Pyrofax was advertising in the *Saturday Evening Post*, and Rockgas was doing radio advertising in California. Standard and Shell have never been famous for missing any important segment of the retail market for petroleum products, and both companies entered the competition. Standard of California, with one of the strongest marketing organizations in the industry, developed the marketing of "Flamo" with characteristic thoroughness, and Shell Oil Co. laid the groundwork for the present nation-wide marketing of "Shellane". Other oil companies were quick to seize on the opportunity to convert some of their formerly wasted butane and propane into marketable liquefied fuel.

Any old truck would do "back when."

First Cylinders Were Heavy

The early L. P. gas cylinders weighed approximately three times as much as the gas that they carried. It was obviously uneconomical to transport so much dead weight back and forth. In 1926 Pressed Steel Tank Co. developed a cylinder which weighed only about 1.25 times the weight of the gas contents. Further developments in lightening the weight of the tank, without reducing its strength or safety, gradually reduced tank weights until those in current production have a steel content of approximately .7 of a pound per pound of propane carried.

One of the really baffling problems in the early days was the production of valves and regulators which would confine and control the product. Propane has pronounced solvent properties, and in the absence of the non-soluble synthetics which were later developed and adapted for this use, effecting a durable gas-tight seal was nearly impossible. Rubber compounds and grease impregnated packings, which were satisfactory with natural gas at the low line pressures used with that product, were quickly dissolved by propane, and retaining closures with metal-to-metal fits was equally impossible over a long period.

During the first few years it was not uncommon for domestic sets to lose many pounds of fuel each day. Stove cocks packed with grease did not hold for long, and escape of gas into kitchens was a source of constant annoyance and worry.

Chaplin-Fulton, who made the early regulators, achieved a partial solution of that part of the problem by perfecting a method of making both the regulator seat and guide with the same tools, thus assuring a perfect preliminary fit without the high expense of precision-fitting by

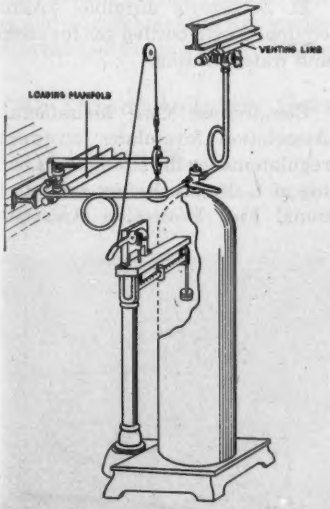
Product	Trade Name	How Regulated	Pressure at Burner	Kind of Burner	Container	Pressure in Tank	Used For	Retails per lb.
86 Gas Machine Gasoline	Oronite, Rock Gas, Gas Machine Gaso, Red Crown Gas Machine	Used direct in cold process gas machine 85% gas, 15% air.	3" water	Standard city gas appliance such as Clark, Jewell	I C C #5	0	Large Laboratories, Cooking.	¢ .06
Casinghead Tops, "Low Flas" Low Rock Gas, Protane		Used direct	15# at 70°	Generating or Modified Gasoline type	I C C #5	15# at 70°	Cooking, Water Heating, Heating.	.13 - .15
Semi-liquid gas	Rock Gas, McMay Gas	In warm climate, with regulator, as gas at 7" water. In cold climate with regulator as liquid at 10 to 15#	7 to 10" 10 to 15#	Standard gas appliance such as Tappan, Reliance, or Vulcan. Generating or modified gasoline type.	I C C #7-70	70# at 70°	Cooking, Water heating, Heating, Cutting.	.12 - .15
Liquefied Petr. Gas - Propane cut.	Skelgas, Philgas, Rock Gas, Pyrofax, Thermoline, Shell.	Large diaphragm gas regulator	7 to 10"	Standard gas appliance with modified orifices.	I C C #26	130# at 70°	Cooking, Cutting, Water Heating.	.10 - .16
Liquefied Petr. Gas Ethane & propane cut.	Butane, Rock Gas, Thermoline, Fuelite	Large diaphragm gas regulator	7 to 10"	Standard gas appliance with modified orifices.	I C C #26	300# at 70°	Principally for cutting, also for cooking.	.15 - .30
Condensed Liquid Gas produced from cracking oil.	Blaugas	Hand reducing valve and regulator	7 to 10"	Standard gas appliance with modified orifices.		1800#	Lights, Cooking, Laboratories.	.20 - .30

Table of early product names, utilization data, and prices.

hand. That company's gas regulators, were the almost sole dependence of the industry until 1928.

Then the Bastian-Blessing Co. and Reliance Manufacturing Co. both began production of special propane regulators. After considerable trouble with seats, both companies developed composition seats and improved nozzle designs which gave almost perfect control, and these units, with only slight changes, are the bases of the regulators which we use today.

Improved fuel production methods, which eliminated the troublesome quantities of ethane, and effectively reduced the working pressure of the equipment, made it possible, about 1928, to change from a two-stage regulator system to the single regulator control which is universally used in domestic systems at this time.



The first automatic cylinder filling system, developed by The Bastian-Blessing Co., in 1928. Not very fast by modern standards, but it did eliminate overfilling cylinders.

Bastian-Blessing Co. and Kerotest Manufacturing Co. were not long in developing dependable cylinder valves, and about 1928, when the business began to assume sizeable proportions, Fisher, Groble, Equitable, Reynolds, and Burdette all broadened their lines and began to specialize in L. P. gas equipment.

The late '20's and early '30's marked the period of most rapid development of the basic equipment items which contributed to safety and efficiency in handling and using L. P. gas. The Bastian-Blessing Co. was particularly prolific in the design of these items. In addition to the cylinder valves and regulators already mentioned, they developed the first automatic cylinder charging system in 1928, the manifold throw-over valve in 1929, and adapted the spring-loaded pressure relief valve to LPG service in the early '30's. They were also the first to use the "POL" connection, which is now standard equipment in the industry.

The use of liquefied petroleum gases in piped town plants dates back to 1928. Phillips Petroleum Co., and engineers from the U. S. Bureau of Mines, had done experimental work during 1927, and the first commercial application was made at Davenport, Iowa, early in 1928. In this plant, liquefied gases were substituted for gas-oil in enriching manufactured gas. In June, 1928, Phillips installed the first butane-air plant, which their own engineers had designed, to supplant a coal-gas plant, at Linton, Ind.

Two months later, working independently, A. N. Kerr installed a similar plant at El Centro, Calif. Other plants of this type were erected in rapid succession from coast to coast. In 1930, the first plant serving an undiluted mixture of propane and butane gases was installed at Moorpark, Calif., by the Southern Counties Gas Co. These plants laid the foundation for the present extensive public utility use of liquefied petroleum gases.

Other facts of importance to the industry preceding 1929 include:

In 1927 the National Board of Fire Underwriters issued the first National Fire Protection Association Pamphlet 58 for "compressed gas systems (including LPG) other than acetylene for lighting and heating."

The Underwriters Laboratories issued in 1928, "standards for construction and performance of compressed gas systems."

The first book on the industry was issued by The Bastian-Blessing Co. and entitled, "Notes on Liquefied Petroleum Gas."

One of the early producers of LPG was Sloan & Zook refinery.

Servel Inc. manufactured the first refrigerators for use with LPG in June, 1928.

In the late '20's Rochester Manufacturing Co. was supplying gauges to the industry.

First Bureau of Mines Report on LPG Marketed Production

Year	*Gallons*
1922	222,641
1923	276,836
1924	376,488
1925	403,674
1926	465,085
1927	1,091,005
1928	4,522,899

1929 Through 1952

- Significant steps, year by year, in the development of the LPG industry which have caused it to increase in volume one thousand times in 23 years.

1929

STANDARDIZATION of fittings for cylinders begins to show benefits to industry.

"Old Store Roundup" organized by industrymen to promote replacements of long-installed appliances.

Bastian-Blessing handbook of data and equipment starts trend toward uniform practices and improved safety procedures.

American Gas Association undertakes program of testing appliances and equipment and development of satisfactory burners and conversion equipment to change from natural and manufactured gas to bottled gas.

Electrical industry views rapid growth of bottled gas business with alarm.

Lone Star Gas Co., Dallas, utility operator, expands business beyond the mains by supplying "Stargas" LPG to customer bulk underground tanks. J. Woodward Martin made salesmanager of Stargas Department.

The U. S. Bureau of Mines estimates a total of 55,000 domestic L. P. gas customers in the United States, and reports that distribution has been extended to all states.

Marketed production for the year, 9,925,698 gallons.

1930

"FULL automatic gas ranges" announced in magazines going to the gas industry and appliance trade.

"Degree Day Heating Book" published by National Trade Journals, Inc.

Natural Gas Properties, Inc., organized by Standard Oil Co. of California, to supply butane-air mixtures through piped town plants in Pacific Coast communities. Applications for franchises obtained in 175 smaller cities. Most of these plants were never built, but publicity helped many bottled gas dealers to expand their operations.

First motor transport trailer for LPG, designed and built by General Petroleum Corp., placed in service by Southern Counties Gas Co., Los Angeles, to supply piped town plant at Moorpark, Calif.

Among first dealer-operated bottling plants was one owned by Mark Anton. His Belvidere, N. J. plant was possibly the first combination bottling and small town gas plant, the latter using the first copper mains for its distribution system.

Marketed production for the year, 18,017,347 gallons.

1931

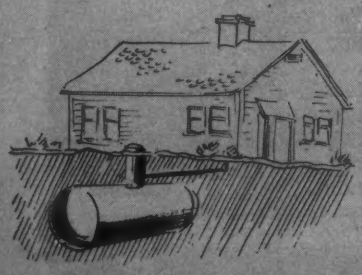
BUTANE-PROPANE *News Department* established in *Western Gas* magazine, published by Western Business Papers, Inc., forerunner of Jenkins Publications, Inc.

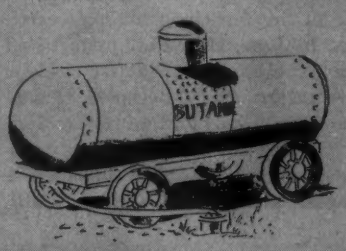
Total of 123 cities in the United States served by butane-air mixtures through underground mains.

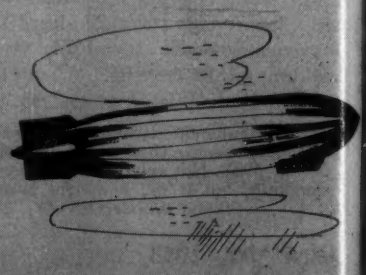
The U. S. Bureau of Standards issues circular outlining the manufacture, properties, and utilization of liquefied petroleum gases. Need for pressure relief valves in containers noted.

U. S. Navy's dirigible, "Akron", equipped with bottled gas for cooking and water heating.

Compressed Gas Maunfacturers Association formulates suggested regulations for the storage and handling of L. P. gas. Refers same to National Fire Protection Association.







Phillips' products pipe line from Borger, Texas to East St. Louis, Ill., started operations in March. Engines on original line used butane exclusively.

Preliminary organization of "National Bottled Gas Association" set up at annual meeting of American Gas Association. Purpose, to foster the growth of the business along logical and ethical lines; to eliminate unethical advertising and practices; to develop better sales methods; to standardize on equipment and appliances. Temporary president, Mark Anton.

National Electric Light Association warns its members against the rising competition from bottled gas, "the best fuel obtainable for cooking, water heating, and refrigeration."

Domestic sales for the year were 53% of total.

Marketed production, 28,502,819 gallons.

1932

ORGANIZATION of National Bottled Gas Association completed. Objectives broadened to include accident prevention, conservation, and advancement of knowledge and invention for the benefit of the industry. Officers: President, Mark Anton, Suburban Gas Co., Belleville, N. J.; vice president, Don G. Kelley, Universal Bottled Gas Corp., Rochester, N. Y.; vice president, Plummer E. Pope, Fuelite Natural Gas Corp., Waltham, Mass.; secretary, Richard F. Ely, Island Home Commodities, Inc., Hickville, N. Y.; treasurer, John G. Rose, Jack Rose Auto Supply, Pittsfield, Mass.; Directors, H. Emerson Thomas, Phillips Petroleum Co., New York; H. S. Bunn, Pyrofax Division, Union Carbide and Chemical Co., New York; Chas. G. Nourse, Suburban Gas Co., Cranston, R. I.; H. E. Double, Bradford Gasoline Co., Bradford, Pa.; W. H. Frank, Pyrofax distributor, Poughkeepsie, N. Y.

Handbook of Butane-Propane Gases published by Western Business Papers, Inc. (now Jenkins Publications, Inc.)

All cooking and water heating is performed with propane at the special Olympic Village, housing the athletes participating in the 10th Olympiad at Los Angeles.

Current bibliography lists 36 major articles on bottled gas appearing in recent issues of national trade and technical magazines.

Detroit Lakes Gas Co. (now Consumers Gas Co.), Detroit Lakes, Minn., serving city consumers through pipe lines, and rural consumers through individual bulk storage tanks, installs meters for rural customers, thus making service uniform for both classes of customers.

Mark Anton

F. R. Featherston

Industry announces goal of one million customers.

University of California Extension Division announces course in "Utilization of Liquid Gas".

Marketed production for the year, 33,630,236 gallons.

1933

NATIONAL Bottled Gas Association and Compressed Gas Manufacturers Association affiliate for joint work on common problems. F. R. Fetherston is made secretary of both groups.

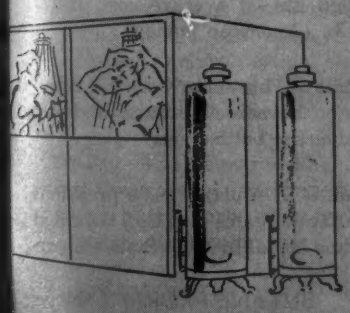
Southern Pacific Railway operates 2-car train on butane between Los Angeles and Santa Barbara. Claims savings of 4 cents per mile, as com-

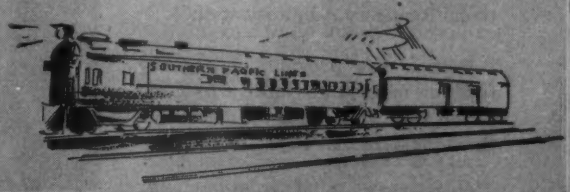
● An Infant Industry Gets Off to a Crawling Start

(Sales in Gallons)

1932 ▮ 33,630,236

1952 4,110,000,000





Uncle Sam finds a new tax system.

pared with previous operation on stove oil.

Sun Oil Co. equips refineries at Marcus Hook, Pa.; Toledo, Ohio; and Yale, Okla., to manufacture propane, and organizes to market the product under name of "Solgas".

Bureau of Mines and Mellon Institute undertake to develop satisfactory odorant for L. P. gas.

Construction camps for Los Angeles Metropolitan Aqueduct and Nevada's Boulder Dam transmission line equipped with propane utility facilities.

Lone Star Gas Co. equips Texas-Pacific dining car with propane system for cooking and heating water.

Buenos Aires, Argentina, gets bottled gas service.

Mine locomotives on Los Angeles Metropolitan Aqueduct tunnel jobs converted to burn butane, with noticeable reduction in noxious exhaust odors and carbon monoxide content.

Pacific Coast regional meeting of Society of Automotive Engineers hears report on results of operating trucks on butane.

Liquefied gas industry code adopted by N. R. A. (In case you have forgotten, that was the New Deal's "National Recovery Administration").

Bottled gas provides emergency fuel for natural gas utility in Long Beach, Calif., following the disastrous earthquake in that city.

Skelly Oil Co. builds million-dollar bottling plant at Minneapolis.

LPG kitchen installed 750 feet underground, at Carlsbad Cavern, New Mexico.

Marketed production, 38,931,008 gallons.

1934

FEDERAL gasoline tax applied to butane and propane.

California Industrial Accident Commission issues safety orders regulating storage and handling of L. P. gas.

API-ASME issues pressure vessel code for LPG industry as result of joint committee action started in 1931 by the American Petroleum Institute and the American Society of Mechanical Engineers.

Pacific Gas Co., S. A., begins marketing propane and butane in Lima, Peru.

Panama Gas Co. markets bottled gas in Canal Zone.

Parkhill-Wade develops service station dispensing pump, safety hose nozzle, and "internal outage tank" vehicle tank.

Wright and Mueller open first marine service station dispensing L. P. gas, in San Diego, Calif.

Honolulu Gas Co., Ltd., builds demonstration kitchen on truck, complete with "Rockgas" in cylinders, to develop Rockgas business in Hawaiian Islands and the Orient.

C. L. Parkhill

H. Em. Thomas

Butane is used to power Spokane Municipal bus system.

Refrigerated trucks for transporting perishables developed, using propane refrigerating system. Expanded vapor supplies truck engine with fuel.

Marketed production, 48,173,000 gallons.

The "Baso" was the first thermocouple operated service valve in the field, made by Baltimore Automatic Shut-Off Co., soon to be a product of Milwaukee Gas Specialty Co.

1935

HEMERSON THOMAS, Phillips Petroleum Co., elected second president of National Bottled Gas Association.

The Interstate Commerce Commission issues rules governing the transportation of LPG by rail, highway, and water.

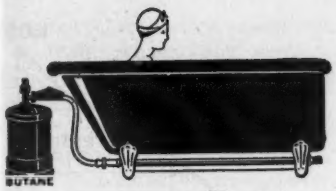
Spokane, Wash., bus system converts to butane operation.

Imperial Oil Co.'s Toronto refinery starts first Canadian production of bottled gas.

350,000 families in France use bottled gas, at average cost of 18¢ per lb. (American money).

Phillips Petroleum Co.'s "Philgas" goes on 13 radio stations in Midwest to advertise bottled gas.

Col. G. A. Burrell (now president of Atlantic States Gas Co.) awarded Lamme Medal by Ohio State Univer-



French families adopt the new fuel for bathing.

sity for outstanding achievement in engineering, in recognition for having discovered and developed Texas helium supply and initiating government helium program. The Army had already given him the Distinguished Service Medal for the same accomplishment.

New lease plan on bottle systems, adopted by Rocky Mountain dealers, adds 15,000 to 20,000 new customers in six months.

National Bottled Gas Association appoints committee headed by M. G. Farrar, of Pyrofax, to work with AGA on improvement of gas appliance efficiencies to meet electric competition.

General Petroleum Corp. adapts 20 oilfield pump engines, originally built for natural gas, to operate on butane.

Dallas Railway and Terminal Co. uses propane for cutting rails, brazing copper cable bonds, preheating switches for maintenance operations and drying sand. Cheaper and better than acetylene or kerosene.

Griffith Co. uses butane as truck fuel in construction of Cajalco Dam, western terminum of Los Angeles Metropolitan Aqueduct. Estimated saving, $50,000.

Extensive use of propane, butane, and other light hydrocarbons for manufacture of high octane gasoline expected from development of process called "polymerization". (The hydrocarbon most used in modern polymerization is isobutane.)

Society of Automotive Engineers (West Coast regional meeting) hears paper on butane carburetion by Paul W. Ensign. Savings in fuel cost, oil consumption, and maintenance expense claimed.

Chicago & Northwestern Railway tests thermostatically controlled propane-fueled air conditioning unit in railway coach. Test indicates cooling cost of $1.50 per 1000 miles. Great future predicted in this field.

Phillips Petroleum Co. orders 20 additional propane tank cars.

California puts 3¢ motor fuel tax on all LPG, both butane and propane. Non-highway users allowed to claim refund. Distributors object to needless hardship of collecting tax and claiming refund on the 95% not used on highways.

Marketed production, 76,855,000 gallons.

1936

CHICAGO & Northwestern Railway air-conditions 28 Pullman cars, utilizing Waukesha propane-operated engines, with full automatic thermostatic control from inside cars.

H. Emerson Thomas re-elected president of National Bottled Gas Association. Annual meeting attended by 100 leaders of the industry.

Imperial Gas Co., Los Angeles, develops 20-lb. trailer bottle, to sell for $16.75 retail, complete with regulator and full of gas. (Installation cost extra).

"Philgas" announces reduced rates applicable to multiple-use, domestic installations, as means of meeting electric competition. Fuel for automatic water heating and refrigeration priced at about 50% of cooking rate. Meters installed to measure fuel used for low-rate appliances.

Geo. A. Burrell

M. G. Farrar

Small cylinders for trailers make hit.

Utilities Distributors, Inc., Peter A. Anderson, president, installs its first bulk plant at Portland, Maine. UDI dealers had previously had their cylinders filled at "Philgas" plants.

National Fire Protection Association issues pamphlet on "Regulations for the Design, Construction, and Operation of Automobile Tank Trucks and Tank Trailers for the Transportation of Liquefied Petroleum Gas". Price, 10¢.

A 200-mile, 8-inch, butane-propane pipe line laid from East Texas oil fields to Baytown, Texas, refinery.

Owing to rapid growth of city, Southern Counties Gas Co., Los Angeles, utilized bottled gas with meters to serve customers in areas within one mile of existing mains. No service rendered to existing customers of established bottled gas dealers in affected areas.

Palomar Observatory is equipped with butane-propane plant for domestic use of staff and to heat observatory buildings and offices.

California State Board of Equalization revises method of collecting motor vehicle tax on butane-propane Tax to be paid, and claim for refunds to be filed by distributor instead of consumer. Same amount of money involved (distributor's capital). Less work for all concerned.

Use of LPG to fuel tractors increasing rapidly in California. Trap-wagon trailers developed as portable service stations to care for tractor fleets in the field.

Fleets of trucks and earth moving equipment in Imperial Dam and All-American Canal projects, in Imperial Valley, Calif., converted to butane. Operators pleased with absence of vapor lock at 120° atmospheric temperature.

Characteristics of ideal L. P. gas range burners defined by joint committee of National Bottled Gas Association, Compressed Gas Manufacturers Association, and American Gas Association. The 100% safety shut-off recommended for all pilots.

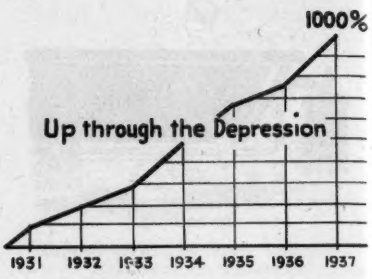
ICC authorizes Union Tank Car Co. to build 100 additional fusion welded tank cars for propane, following acceptance of 25 cars previously built on experimental basis.

An LPG-burning tractor grading roads about 1938.

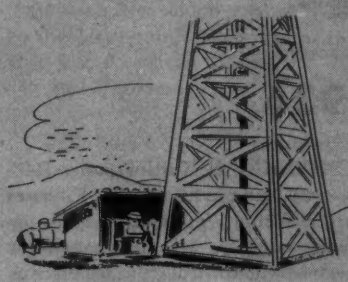
U. S. Forest Service fights fire with propane torches. Small back-pack outfits developed for back-firing by Ransome Co. This company also made a collapsible field range for cooking, the first of its kind.

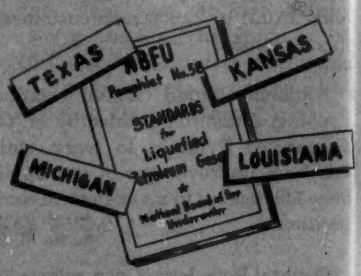
New Standard Oil Co. and Imperial Gas Co. plants at Huntington Beach, Calif., equipped with air-operated automatic shut-off valves on cylinder charging scales. Output per man greatly increased.

Marketed production, 106,652,000 gallons.



customer tanks, 250 gals., installed for same average cost as city gas service. Customers billed monthly for fuel actually used. Rates on sliding scale, lower than competing electric rates.





1937

WALTER VERKAMP, of Verkamp Corp., Cincinnati, elected president of National Bottled Gas Association. 150 members attend national meeting. M. G. Farrar, of Pyrofax, presents survey of uses for L. P. gas outside the domestic field.

G. G. Oberfell, vice president, Phillips Petroleum Co., points out that the LPG industry expanded 1000% during the depression years because "we didn't know what could not be done." Predicts that "the future will be just as bright in 1950 as it is today, if we maintain the same youthful attitude."

Lone Star Gas Co., Dallas, Texas, announces "New Stargas Service." Features — individual underground

F. Harry Andrews, Phillips Petroleum Co., gives rules for safe transportation and transfer of LPG.

Crekmore Drilling Co. is first Mid-Continent operator to use butane-propane as power fuel for drilling oil well — Amerada Petroleum Corp.'s Travelers No. 1 well, Coal county, Oklahoma.

AGA issues booklet on "Summer Air Conditioning With Gas." Basic unit considered is adaptation of Waukesha propane-operated ice machine previously used for air conditioning Chicago & Northwestern trains.

Midwest Section of National Bottled Gas Association formed. B. D. Geroy, of Illinois Bottled Gas Co., is elected president.

Canadian Pacific Railway equips refrigerating car with propane-oper-

ated temperature control equipment, to maintain refrigerating temperature in summer and prevent freezing in winter.

Los Angeles adopts gas heating code recommended by AGA, covering both natural and L.P. gas.

Blythe Gas Co., Blythe, Calif., installs butane-propane utility plant, complete with storage, vaporizer, and distributing system in 31 days.

National Bottled Gas Association issues list of appliances approved for LPG by American Gas Association.

Shell Oil Co. completes 100th "Shellane Modern Cookery Show" in 5-state campaign covering dealer locations in Iowa, Minnesota, Wisconsin, Illinois, and Missouri.

D & B Pump Supply Co., Dallas, Texas, uses "Stargas" butane for carburizing atmosphere in surface hardening of pump parts and sucker rods. Advantage — butane is lowest cost useable material having constant carbon content.

Col. George A. Burrell, Atlantic States Gas Co., estimates that between 350,000 and 400,000 customers are served by LPG industry. Also notes that more than 16,000,000 families still have no gas service.

Marketed production, 141,505,000 gallons.

1938

UNDER the initiative and guidance of Col. Ellsworth L. Mills, National Bottled Gas Association broadens its scope to include the entire industry, changes its name to Liquefied Petroleum Gas Association, and effects a merger with the former Underground Systems Division of the industry. Walter F. Verkamp, president, appoints legislative committee. 110 delegates attend first meeting of merged group.

W. F. Verkamp

G. G. Oberfell

F. Harry Andrews

B. D. Geroy

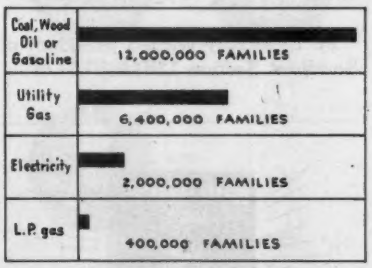
Col. E. L. Mills

Bupane Gas Co., Cedar Rapids, Iowa, expands in 4½ years from $12, one-man company to 12 states and 10,000 customers. Otto A. Kohl is president.

"Philgas" distributes ranges bearing company trademark. Prices, $59.50 to $169.50. Also offers water heaters and refrigerators under "Philgas" brand. Advertising program includes 24 sheet posters on billboards.

Ford Motor Co. installs butane standby system at River Rouge plant.

1938 COMPARISON OF FUEL USED IN COOKING



"Philgas" calls attention to importance of automatic water heater as potential load builder, and as the industry's best means of defense against inroads of electric competition.

LPGA sectional meetings devoted principally to consideration of safety equipment, safe transportation, and the new wage and hour law.

Big dealer meetings indicate rapid growth of industry — "Dri-Gas" dealer meeting attracts 308; UDI meeting has 150 dealers.

• On Up Through the Depression

(Sales in Gallons)

1937 — 141,505,000

1952 — 4,110,000,000

"Certified Performance" range program inaugurated by GAMA.

Growing importance of L. P. gas industry indicated by legislative attention — safety codes based on National Board of Fire Underwriters (NBFU) Phamphlet 58 adopted by Texas, Michigan, Kansas, and Louisiana.

AGA expands laboratory facilities for testing L. P. gas appliances. Issues first list of approved appliances.

Universal Oil Products Co. develops catalytic polymerization process for making gasoline from butane, propane, and ethane. Union Oil Co. has new process for selective refining of lubricating oil, using propane solvent to remove undesirable ingredients. Might affect future supply of gas for domestic use.

Atlantic States Gas Co. reports installation of 9009 metered consumer bulk systems in first 15 months of operation.

$4000 butane power plant replaces old steam boiler system at Hobbs Cooperative Cotton Gin, Scurry county, Texas.

29 producers of liquefied butane and propane listed in "Directory of Manufacturers".

Marketed production, 165,201,000 gallons.

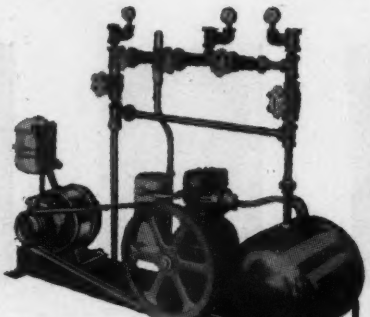
1939

BUTANE-PROPANE News established as a monthly, and the first trade magazine dedicated to the service of the liquefied petroleum gas industry.

First *Butane-Propane News Catalog* published.

Safety codes based on NBFU Pamphlet 58 adopted by Oklahoma, Kentucky, Arkansas, and Tennessee.

Other legal enactments: Oklahoma imposes 4% excise tax on LPG and diesel oil. Texas law requires odorization of L. P. gas. Iowa law restricts use of LPG in state to ICC containers. Texas requires licensing and bonding of every individual or firm engaged in manufacture, assembly, sale, or installation of any apparatus for storage, dispensing, or transportation of LPG in state. Arkansas law requires annual inspection by state representative, expense to be borne by owner of gas equipment.



The Roney compressor, first of the LPG compressors to be made.

Vapor pressure differential system developed by L. C. Roney Co., for transferring liquid between transportation and storage tanks. First installation, Carter-Hunter Oil Co. plant, Imperial, Calif.

M. E. McKay elected president of Southern Section LPGA.

Butane-Propane News becomes magazine in its own right.

M. E. McKay

J. W. Martin

George C. Oberfell, vice president in charge of research for Philgas Division, Phillips Petroleum Co., given Hanlon Award by Natural Gasoline Association of America, for "significant services in advancing the interests, standards, or technical procedures of the natural gasoline industry."

Significant new uses for LPG publicized: Cost of metallizing reduced 40% through use of propane torch. Champion Spark Plug Co. uses propane for firing ceramics kiln in manufacturing electrodes. Propane used for pre-heating rail ends preparatory to building up by electric welding. Serious losses of garlic crop prevented by drying freshly harvested bulbs with LPG heat. Fuel costs cut one-third by firing meat-curing smoke houses with butane. Tremendous losses of rice crop prevented in California by artificial drying. Marysville, Mo., "Record-Journal" installs LPG for melting linotype metal.

200 attend LPGA convention at Oklahoma City. J. Woodward Martin elected president for two-year term. Need for standardization of product emphasized. Alcohol recommended as cure for freeze-ups of regulators. First trade show held.

Wm. B. Scaife & Sons established an industrial fellowship in Mellon Institute to conduct scientific research pertaining to processes of fabricating and use of tanks and cylinders.

AGA Testing Laboratories now approve heating appliances for L.P. gas.

University of California opens extension course in butane power.

Union Pacific Railroad operates streamlined train, "City of Salina" on butane over 520-mile daily run from Salina, Kan., to Kansas City, Mo., and return to Salina by way of Topeka.

Milwaukee streamliners equipped with LPG cooking and water heating appliances.

First Russian LPG service station installed in Moscow.

Geo. W. Gray, Verkamp Corp, awarded prize for best design for LPG industry emblem.

Marketed production, 223,580,000 gallons.

1940

CALIFORNIA Natural Gas Association issues pamphlet setting up tentative standards and test methods for six grades of L. P. gas, ranging from "predominantly butane" to "predominantly propane".

ICC authorizes use of deck-mounted 1000-gallon containers to transport butane to Puerto Rico and the Virgin Islands.

Bemidji Bottlegas Co., Bemidji, Minn., purchases local gas utility company. Generally, the utility companies go into the bottled gas business to protect their fringe areas.

Servel, Inc. produced LPG all-year air conditioner for summer cooling and winter heating with one fuel and one unit.

Army and Air services adopt propane field kitchens for use where portability is required.

Two items from June, 1940 issue of BPN:

"At a meeting of the Natural Gasoline Assoiation of America a speaker states that the day when a man could go into the L. P. gas distribution business with $50 and a borrowed truck, is past."

"Harold E. Greenwood, a former forestry worker, bought the plant of the Gardner Gas, Fuel, and Light Co. for $1.00." (Greenwood still operates, with a large storage plant and five times as many customers).

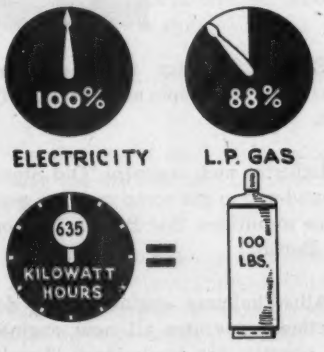
Shortage of natural rubber tires created need for synthetic ones. Isobutane used as base.

LPGA convention gets warning that the government wants to take over the business. Recommended defensive measures, better management and improved safety practices.

Rash of discriminatory ordinances, promoted by electrical industry, breaks out across the country. LPGA organizes to combat the program.

"Power" department added to *BUTANE-PROPANE News.*

COMPARISON OF COOKING SPEED AND BTU RATIO



BUTANE-PROPANE News publishes first national directory of highway service stations dispensing LPG.

Electrical Merchandising magazine concedes that "by a conservative estimate there are as many tank-gas ranges as electric ranges in the U. S."

After years of preparation, the U. S. Department of Agriculture publishes Leaflet 191, "Liquefied Gases in the Household". It cites the faster cooking speed with LPG, (88% of the time required for electric cooking) and states that 100 pounds of propane equals 635 kilowatt hours of electricity. Bureau of Standards publishes same Btu ratio.

Production of synthetic rubber from LPG components (principally isobutane) now becomes important as military needs increase and supply of natural rubber diminishes.

Thirtieth national conference on Weights and Measures devotes half day to the problems of measurement of L. P. gas, and methods of testing measuring apparatus.

American Gas Association opens Pacific Coast branch testing laboratory in Los Angeles.

North American Gasoline Tax Conference works for uniform tax on LPG when used on highways. Five states, Illinois, Kansas, New Jersey, New Mexico, and Oklahoma, adopt the recommended law.

Propane movement hampered by tank car shortage. Condition acute on Atlantic seaboard. Need for more storage at marketing end emphasized.

10,000,000 families still need gas service beyond the mains.

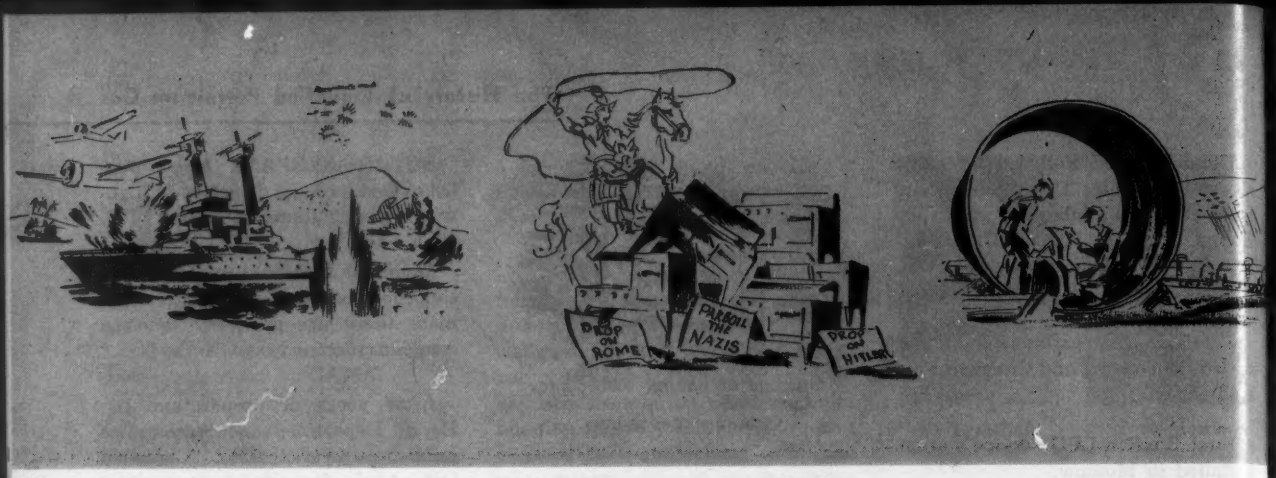
Due to impetus of a successful display at the Arkansas Live Broiler show, cold-room brooding with L. P.

● The Industry Begins to Hit Its Stride

(Sales in Gallons)

1940 ——— 313,456,000

1952 ——————————————————— 4,110,000,000



gas heat gets tremendous impetus, opening up important new market for fuel.

Marketed production for the year, 313,456,000 gallons.

1941

JAPS attack Pearl Harbor. Industry problem changes from plans for expansion to how best to take care of present customers. Estimated users, 1,780,000.

Defense preparations increase. Many army camps equipped with LPG kitchens and bathwater heaters.

Biggest sideline of industry — installation of standby plants in armament factories.

LPGA convention told that armament spending accomplishes what "pump priming" failed to do. Sales of various appliances rise 25.2% to 74.6% over the same period in previous year. (New Deal claims full credit).

Newport News Shipbuilding and Drydock Co. builds 1200 homes for workers. Propane supplied for all cooking and water heating equipment. Many other similar installations follow in other defense industry areas.

After one year test, Carnation Co. installs butane to operate 135 local delivery trucks in Los Angeles.

Rural Electrification Authority makes survey of 50,000 customers' homes wired for electricity within the past year to determine percentage of appliances competitive with electricity (figures show electric appliances):

Range	3.1%
Hot plate, 1	19.2%
Roaster	1.7%
Coffee maker	6.3%
Refrigerator	32.3%
Water heater	1.2%
Brooder	3.2%
Water pump	18.5%

Geo. W. Bach elected president of LPGA. National advertising campaign planned. Steps taken to raise $100,000 promotion fund.

Geo. W. Bach

Electric industry seizes on war scare to warn people away from L. P. gas.

Industry men organize "Old Stove. Round-up" to get scrap metal to produce munitions "for Britain to drop on Berlin."

Allis-Chalmers engine testing department operates all new engines on propane for preliminary "break-in" period.

"They never had it so good". Federal prison at Tucson, Ariz., equipped with butane for cooking, water heating, barracks heating.

Fresno Bee sponsors "Butane Week". Farm section of Sunday edition is devoted entirely to the use of butane and butane equipment.

NBFU issues Pamphlet 90, on the use of gas in air conditioning installations.

Priorities hit the industry. LPGA organizes program to keep essential materials from being siphoned off to other industries.

Mexican airplane flies from Mexico City to Washington, D. C., using butane as fuel all the way.

Magnetic type constant reading tank gauge introduced by Rochester Manufacturing Co.

Texas Attorney General rules that L. P. gas distributors operate public utilities, and are therefore subject to "gross receipts tax". Revolution is threatened in Texas.

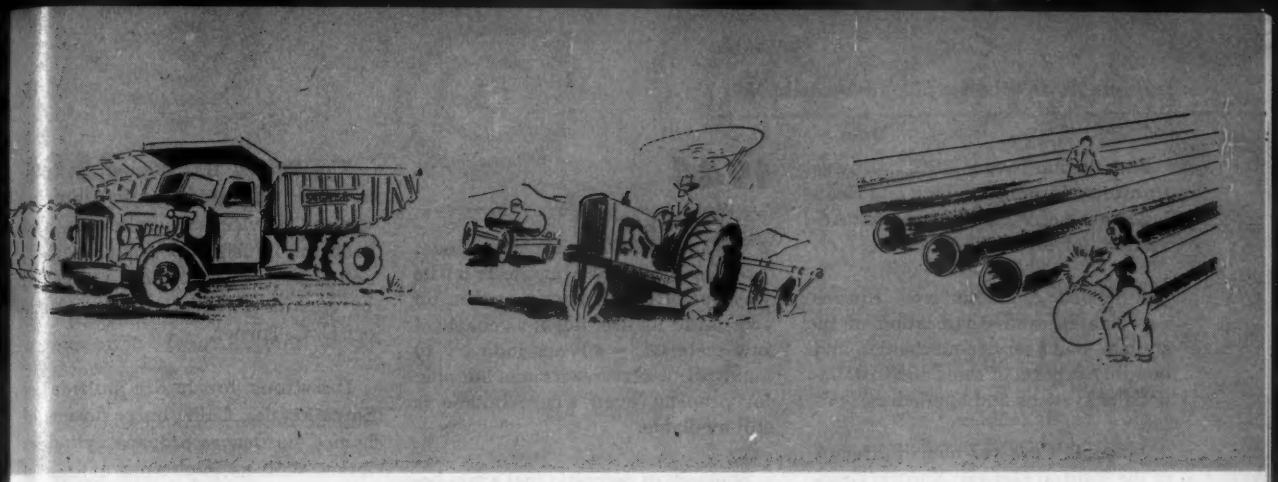
Texas hurricane damage causes five-day shut-down of natural gas pipe line serving Colorado Springs, Denver, and other Colorado towns. Propane standby system relieves hardships.

Butane-burning standby power plant installed by Phoenix radio station KTAR for use in case of power failure or blackout.

Minneapolis-Moline introduces first tractor to be factory equipped for operation on propane.

LPGA sets up first Technical and Standards Committee.

Marketed production, 462,852,000 gallons.



1942

WAR Production Board issues orders freezing all L. P. gas equipment, materials, and gas burning domestic appliances.

Plans for LPGA national convention cancelled, and national advertising and promotion plan deferred, on account of war.

LPG equipment allocations placed under jurisdiction of Plumbing and Heating Division of OPM.

Propane aids infant industry — literally. Gerber Products Co., largest producer of prepared baby foods, installs propane system to supply cooking heat.

Propane tanks provide instant and adequate pressure for operation of air-raid-warning sirens.

Price of stoves pegged by order of Price Administrator Leon Henderson.

Texas dealers and distributors form state-wide association.

Shortage of propane tank cars impends. Ordinary railway tank cars converted to haul butane and isobutane.

LPGA opens Washington office to keep government agencies and industry in closer harmony.

4000-gallon vertical tank installed in Los Angeles service station. Looms up like a lighthouse.

Fresno, Calif. Farm Bureau petitions office of Petroleum Coordinator not to curtail use of butane in tractors.

Technical developments in manufacture of synthetic rubber and aviation gasoline ease war's demand for L. P. gas. Shortage of transportation equipment offsets gain.

Louis Abramson

Geo. W. Bach reelected president of LPGA.

Manufacture of steel furnaces for civilian use discontinued by order of WPB.

Butane used to pre-heat coke ovens at Kaiser steel plant, Fontana, Calif., saving time in coke production and producing more uniform quality.

Blood plasma for war shipment dried and sealed by propane heat.

Marketed production, 585,440,000 gallons.

1943

ICC rules that freight rates on L. P. gas shall be charged on basis of actual weight, instead of on same basis as gasoline, thus reducing rail freight charges by approximately 15%.

Underground storage, to conserve 25 million cubic feet of natural gas per day, approved for Southern California. This was forerunner of underground storage program for L. P. gas.

Development of synthetic products, using butane as raw material, continues. Enlargement of synthetic rubber program diverts many tank cars from propane to butadiene service.

Louis Abramson, Jr., elected president of LPGA.

Hanlon Award of NGAA goes to F. T. Peterson, for outstanding accomplishment in the early development of the LPG industry.

Following two-year test of initial fleet installation, a large number of trucks in the Minnesota Iron Range are converted to propane. Results show saving over gasoline or diesel.

• The Industry Feels the Influence of War Restrictions

(Sales in Gallons)

1942 — 585,400,000

1952 — 4,110,000,000

Jurisdiction over LPG industry transferred from Plumbing and Heating Branch of WPB to Petroleum Administrator for War.

Amended Arkansas law requires examination and certification of installation and service mechanics, and monthly reports of sales and installations of systems and appliances.

James E. Pew was named director of the Natural Gas and Natural Gasoline Division of the Petroleum Administration for War. Paul K. Thompson served as chief of the L. P. Gas section.

Many appliance plants converted to production of war materials.

USDA booklet advocates home dehydration of vegetables to conserve victory garden surpluses. WPB authorizes construction of 100,000 domestic dehydrators.

Oregon changes motor fuel tax law to relieve distributors from paying tax on all fuel sold, and to eliminate need for filing claims for refunds by non-highway users.

Order P-98-e sets up allotment method for obtaining material needed for maintenance and repair.

ODT diverts short haul petroleum movements from tank cars to tank trucks.

Farm survey shows 20,000 tractors in San Joaquin Valley, Calif., converted from gasoline to LPG.

Association meetings begin to plan for postwar conditions — months ahead of the peace conferences.

Faster and more accurate methods developed for analyzing hydrocarbon mixtures.

Central heating of homes with LPG begins to assume large importance as a load builder, and industrial applications are expanding in number, especially in outlying plants making war materials.

Marketed production, 675,233,000 gallons.

1944

GEO. R. BENZ, Phillips Petroleum Co., warns that butane is on its way out of the domestic market, on account of its usefulness as chemical raw material — advises industry to make all new storage tanks suitable for propane, even where butane is still available.

Shortage of domestic fuel again becomes critical. Additional storage of summer surplus recommended.

A. N. Kerr predicts the industry will sell 5,260,000,000 gallons in 1950, and shows that enormous summer storage will be necessary to meet winter demand.

James E. Pew

Paul K. Thompson

Geo. R. Benz

E. E. Hadlick

Louis Abramson, Jr., and other 1943 LPGA officers reelected for 1944.

War Department orders construction of 400 new high pressure tank cars.

Dominion Natural Gas Co., Bradford, Ontario, Canada, constructs 26 emergency propane storage tanks by capping 24-in. seamless steel tubes, each 425 feet long.

PAW order L-86 denies use of LPG for operation of passenger cars.

"Gas Summer Air Conditioning" booklet issued by AGA.

WPB announces that electric ranges fail three times as frequently as gas ranges.

The Bottled Gas Manual, a textbook and field guide for distributors, dealers, service men, salesmen, and users of liquefied petroleum gases, equipment, and appliances, published by Jenkins Publications, Inc. Author: C. C. Turner.

Disastrous brush fire outside of Santa Monica, Calif., burns dozens of homes, but leaves propane cylinders intact, with no explosions or loss of product.

Many L. P. gas jobs included in War Manpower Commission's list of essential activities.

Alabama Public Service Commission declares Green's Fuel, Inc., operation outside of Mobile a "public utility," and demands that the company apply for and obtain PU certificate, or cease operations. Test case would affect all other operators in state. Later, Alabama Circuit Court rules that Green's Fuel is not a public utility.

Limited production of civilian durable goods, including gas appliances, resumed on spot basis.

War Production Board announces plans for quick conversion to civilian production after defeat of Germany.

Industry members begin to build for postwar expansion.

Marketed production, 1,060,156,000 gallons.

1945

JAPAN surrenders! All war restrictions abolished. Reconversion gets into high gear. Industrial and chemical consumption drops. Domestic consumption booms. All tank car restrictions revoked.

First published discussion of "adequate consumer storage" plan prepared by Henri Jennings.

Space heaters, fueled from cylinders, speed up drying of plaster in Denver subdivision — advances completion of homes by ten days.

OPA establishes ceiling prices for LPG.

Ernest Fannin

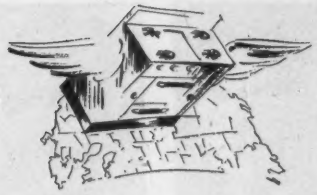
Howard D. White

LPGA elects Ernest Fannin president.

Converted diesel truck undergoes test in Southern California.

Use of LPG by utilities increases 138% during the war.

Appliance sales get off to a flying start following the German surrender. New model stoves flown to key destination points as far away as Pacific Coast.



Dealers were so hungry for appliances, some were flown by air to speed deliveries.

National Butane-Propane Association organized. First president, Elwin E. Hadlick.

Agricultural flame weeders developed. Early tests in cotton and sugarcane fields show great reduction of cost of controlling weeds.

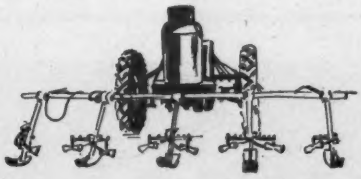
Texas dealers abandon insurance plan when casualty companies offer coverage.

National L. P. Gas Institute organized in Tulsa, Okla., to train technical and service men for the industry. Subjects offered: Engineering Fundamentals; L. P. Gas Equipment; Safety and Specifications; Laboratory Testing.

Suburban Propane Gas Co. organized to consolidate the Mark Anton interests. Company acquires 13 Eastern retail properties from Phillips Petroleum Co. for $11,000,000.

Marketed production, 1,276,766,000 gallons.

Flame weeding machines, burning LPG, opened great new field to the industry.



1946

NFPA analysis shows 10 times as many fires from electrical causes as from gas — and that includes both utilities and L. P. gas.

Reorganized LPGA moves to Chicago. Howard D. White elected executive vice president. F. R. Fetherston elected vice president of technical division. Budget expanded to bring advantages of membership to all segments of industry.

Automatic home laundry and automatic dishwashers welcomed as creators of demand for more hot water.

75% of orders for new Hall-Scott truck engines specify butane carburetion equipment.

J. R. Verkamp

Chas. O. Russell

Charles O. Russell elected president of LPGA.

LPG Research Committee of National Conservation Bureau publishes pamphlets on safe operations in the L. P. gas industry.

J. R. Verkamp elected president of National Butane-Propane Association.

● Post-War Progress Lies Ahead

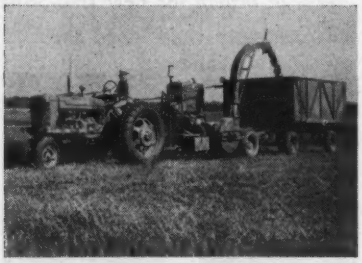
(Sales in Gallons)

1945 — 1,276,766,000

1952 — 4,110,000,000

Enlarged Technical and Standards Committee of LPGA, under chairmanship of Walter H. Hoagland, undertakes study of 11 of the most pressing utilization problems, including safety practices and equipment, vaporizing and regulating problems, tank truck design, and re-testing of vital equipment.

Carter Oil Co. describes results of five years of experimental work in storing several million gallons of summer surplus LPG underground in depleted oil fields. Advantages, more economical and safer than aboveground storage in steel. Disadvantage, product must be re-refined to remove other petroleum products emerging with butane and propane.



Alfalfa dehydration equipment at work in the field.

National Electrical Manufacturers Association warns electrical utilities that "tomorrow may be too late to head off the competition of L. P. gas."

Tank car shortages again plague the industry.

ICC regulations amended to permit use of fusion welded cylinders with longitudinal seams.

Marketed production, 1,705,282,000 gallons.

Tallent Ransome

Kenneth H. Koach

Si G. Darling

Wm. K. Warren

1947

AFTER much commotion in the industry, and no record of cylinder failures due to age or normal deterioration, ICC extends the former 5 year test period to 10 years.

Newspaper advertising campaign for larger storage at point of use prepared by Kansas LPGA.

Warren Petroleum Corp. builds the SS Natalie A. Warren, first ocean-going ship built especially for transportation of L. P. gas. Design includes 80 cargo tanks, with total capacity of 1,386,000 gallons. The ship started on a schedule of two round trips per month between the Gulf Coast and Newark, N. J.

Tank cars still short. ODT suggests painting domes white and training railroad switch yard crews to accelerate their movement.

Oklahoma dealer association takes up "larger consumer storage" campaign; also starts organized sales training program designed to combat electrical merchandising.

L. P. gas clothes dryers appear.

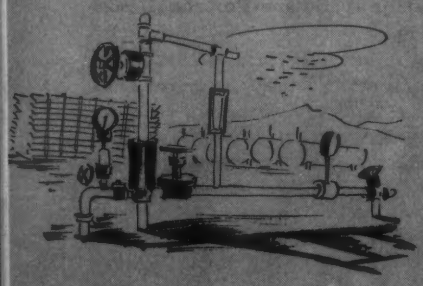
Natural Gasoline Association of America presents Hanlon Award to Wm. K. Warren, president of Warren Petroleum Corp., in recognition of his sponsorship and financing of a tremendous storage program.

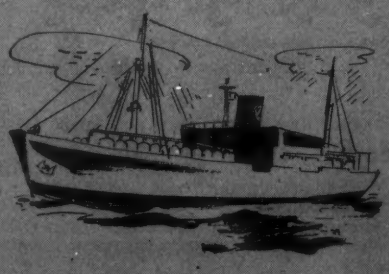
Lang Motor Co.'s Long Beach, Calif., bus operation completes 10 million miles on LPG—saves $150,000 in engine maintenance.

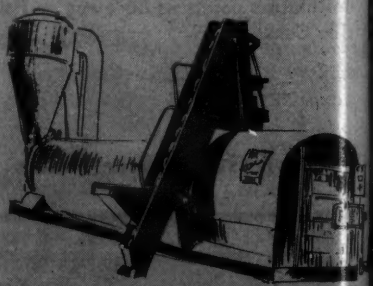
National Electrical Manufacturers Association admits loss of one-seventh of power industry's potential small town and rural appliance load to L. P. gas.

There are 480 plants producing LPG in 1947.

Propane is used to drive and heat large scale mechanical farm crop dehydrators.





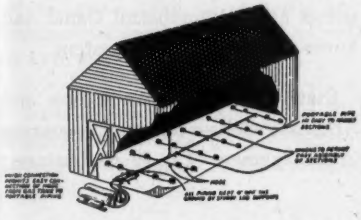


More than 1000 industry men attend LPGA convention. Tallent H. Ransome elected president.

Development of tobacco curing equipment opens up big, new market for LPG.

Use of butane and propane by utilities doubles in the year; motor fuel use reaches 100,000,000 gallons.

Marketed production, 2,209,797,000 gallons.



Tobacco curing barn in which LPG is used for curing.

1948

STUDY by National Petroleum Council shows that peak demand for L. P. gas is still ahead of normal production rate, and that shortage of transportation equipment is still the bottleneck.

LPGA establishes "Distinguished Service Life Membership Award," to be given to one individual each year, in recognition for outstanding contributions to the welfare of the industry.

Col. George A. Burrell receives Hanlon Award from NGAA, in recognition for his pioneer work in developing equipment and methods for the exact analysis of natural gas.

Butane-Propane News publishes Safety Issue—the most complete and comprehensive publication on safety yet to appear in the industry. First printing of twice the usual number sold out. Second printing necessary.

Kenneth Koach elected president of LPGA.

Virginia Beach Gas Co., Virginia Beach, Va., installs propane utility system, laying copper mains as insurance against salt water corrosion.

Shipments of L. P. gas appliances reach all-time high.

Kenneth R. D. Wolfe, Fisher Governor Co. heads educational committee of LPGA, which instituted the sectional service school that later proved so valuable to industry men across the country.

ICC again recognizes low weight of L. P. gas as basis for freight rates—then raises freight rates.

K. R. D. Wolfe

LPGA ranges now given AGA "CP".

Marketed production, 2,736,801,000 gallons.

1949

INDIANA Public Service Commission states, after due study, that the L. P. gas dealer's business bears no relation to a public utility operation.

Louisiana Public Service Commission files suit to gain jurisdiction over L. P. gas industry in that state on grounds that it is a public utility.

Texas Butane Dealers Association, dissatisfied with commercial insurance rates, sets up its own insurance company, under the name of American Lloyds.

Sales departments find that the "come-and-get-it" philosophy no longer works. Change policy to "get out and sell."

● More Than Twice As Big in Three Short Years

(Sales in Gallons)

1948 — 2,736,801,000

1952 — 4,110,000,000

After legal battle of three years' duration, Arizona court decides that L. P. gas is not subject to Arizona Corporation Commission control as a public utility.

Cylinder deliveries by airplane prevent hardships in Montana rural homes isolated by the big blizzard which closed some mountain roads for three months. Owners of 1000 gallon tanks did not run out of fuel.

Arizona Tax Commission rules that electric cooperatives are taxable on the same basis as the privately owned utilities with which they compete.

Butane-Propane News receives Industrial Marketing Magazine's annual award for editorial achievement, in recognition of the outstanding merit of the June, 1948, Safety Issue.

Francis E. Rice, vice president, Phillips Petroleum Co., receives Hanlon Award for NGAA, for pioneering in superfractionation, and for establishing the first research laboratory devoted exclusively to the study of the properties of natural gasoline and liquefied petroleum gases.

LPGA elects Si G. Darling as president.

Course in "Gas Fuel Technology," sponsored by LPGA, established at Georgia Institute of Technology.

Harold W. Wickstrom, technical editor of *Butane-Propane News*, and one of the editors of Handbook of Butane-Propane Gases, and a leading consulting engineer in the industry, passes away.

Bureau of Mines publishes first regional breakdown of L. P. gas sales.

Of approximately 200 bills referring to or affecting L. P. gas operations introduced into state legislatures during the year, the number passed that would work to the detriment of the industry was — none. Shows the value of state and national organizations and hard work.

Cotton picking with propane-powered equipment has become big business.

LPGA, the Gas Appliance Manufacturers Association, the National Gasoline Association of America, and the California Natural Gasoline Association launch nation-wide promotion plan, designed to sell the public on the industry and its products. Plan includes publicity, advertising, employe training, and public relations.

Marketed production, 2,836,599,000 gallons.

1950

CONFERENCE of Weights and Measures officials adopts uniform standards for measurement of L. P. gas, by the pound, the gallon, and the cubic foot.

Television becomes greatest competitor for the consumer's spare dollars.

LPGA and Kansas State College conduct the first service school devoted exclusively to LPG as engine fuel.

Rain-making method using propane to vaporize silver iodide gains international publicity.

Portable crop dryers offer savings for farmers and summer volume for L. P. gas distributors.

Peter A. Anderson elected president of LPGA.

LPGA Distinguished Service Life Membership award goes to Mark Anton, in recognition for his early efforts to accomplish the organization of the industry.

Results of defense spending swing nation's economy back to "seller's market".

Chicago Transit Authority orders 500 propane passenger buses.

Warren Petroleum Corp. builds barge for transportation of L. P. gas from Gulf Coast production plants to points along Intercoastal Canal and lower Mississippi river system.

State associations for Texas and Arkansas sponsor instruction courses in management of L. P. gas business.

Peter Anderson

A. N. Kerr

Milwaukee taxicab fleet of 279 vehicles converted to propane.

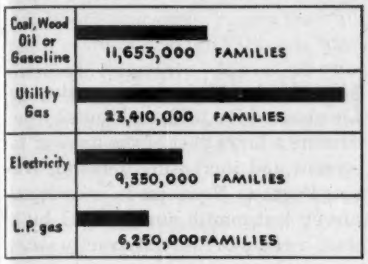
Marketed production, 3, 550,330,000 gallons.

1951

A. N. KERR, first to produce L. P. gas from natural gasoline, receives LPGA "Distinguished Service Honorary Life Membership" award, for his "untiring and selfless contribution to the growth of the industry."

Unusually cold weather, switchmen's strike, and insufficient transport equipment again emphasize need for more storage at all points from refinery to customer's yard.

1951 COMPARISON OF FUEL USED IN COOKING



NFPA issues "Inspection Manual," covering all kinds of domestic and commercial gas installations, as well as L. P. gas "systems".

New Defense Transportation Administration works on problem of increased utilization of the available propane tank cars.

Ratio of electric to gas fire losses still climbing—NFPA report shows fires due to electric hazards cause 12.2 times as much loss as those due to gas, including both utility and LPG. (Interesting side note—season's insured fire losses from lightning exceeds all gas fire losses by more than 300%.)

W. S. Lander elected president of LPGA. Program to promote adequate consumer storage launched.

Outstanding subjects of national and most state convention talks are underground storage and load balancing.

American Petroleum Institute devotes half-day session at annual convention to problems of the LPG industry.

12,600 pressure cars available for movement of LPG during coming winter.

First dealer-owned underground storage cavern completed. (General Gas Corp., Baton Rouge, La.)

Marketed production, 4,227,275,000 gallons.

1952

A SURVEY by the Petroleum Administrator for Defense shows that since 1950, when underground facilities for L. P. gas storage were first built, 26 producing companies and LPG distributors have planned or completed a total of 77 underground storage projects, with an aggregate capacity of 246,204,000 gallons.

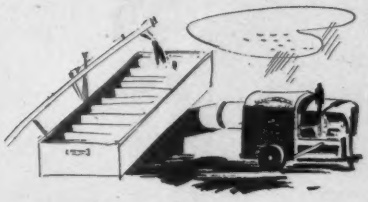
The L. P. Gas Information Service promotes the publication of several large feature sections in state and regional farm papers, emphasizing the growing importance of LPG in rural living.

F. N. Mabee

W. S. Lander

Phillips Petroleum Co. completes LPG pipe line from Borger, Texas, plant to the Chicago area.

U. S. Bureau of Labor Statistics announces that the cost of L. P. gas has gone up only 7% in the past 10 years.



LPG crop dehydrator.

Tremendous potential market for L. P. gas in farm, industrial, and transportation fields emphasized by publication of entire issue of *Butane-Propane News* devoted to these applications. Many new uses listed which increase summer demand.

International Harvester Co. and Reo Motors, Inc. bring out the first quantity production model trucks to be factory-equipped to burn propane.

Year starts with 8,000,000 customers using L. P. gas.

"Butane-Propane Power Manual" published by *Butane-Propane News*.

ICC extends 10 year retest period for cylinders to 12 years.

2500 persons attend LPGA convention. Foster N. Mabee elected president.

Distinguished Service Honorary Life Membership award presented to Mercer G. Farrar, for meritorious service to the industry in the development of technical standards and the promotion of safety.

OPS permits upward revision of ceiling prices of L. P. gas.

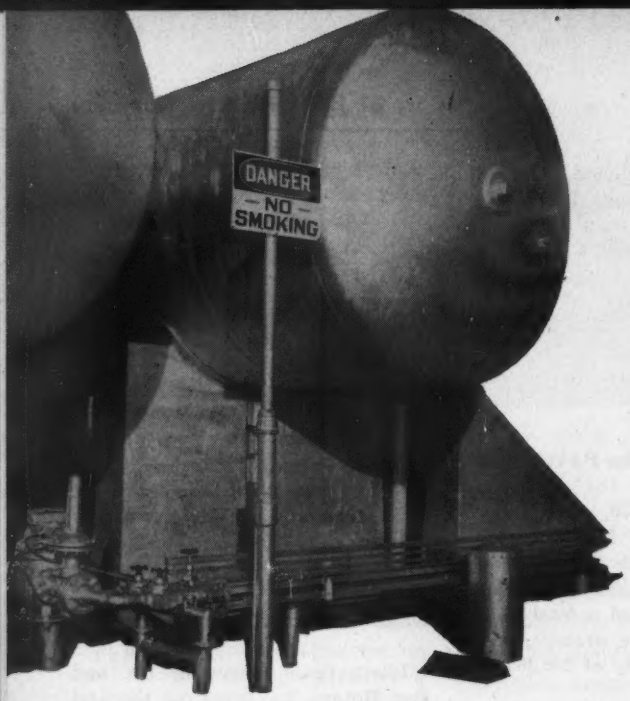
Federal Reserve Board suspends regulation W, thus permitting extension of credit selling.

Marketed production, 4,110,000,000 gallons.

• • •

● **"That Other Heights Lie Ahead, There Is No Doubt"**

1952 4,110,000,000



BPN survey

50,000,000 GALLONS of New Storage in '53

● Survey Shows 40% of LPG Bulk Plants Will Expand. 30,000-Gallon Tanks Most Popular. Biggest Increase Per Plant Will Be in States East of the Mississippi.

IN order to learn what new storage is planned for 1953, and thereby determine a large part of the answer to present and increasing demand, *Butane-Propane News* made a national survey last month among LPG bulk plant owners to find out exactly what increased storage capacity is in prospect for the industry.

Questionnaires were sent out to 4601 bulk plants on our lists to ask them if they intend to increase storage capacity in '53, and how much.

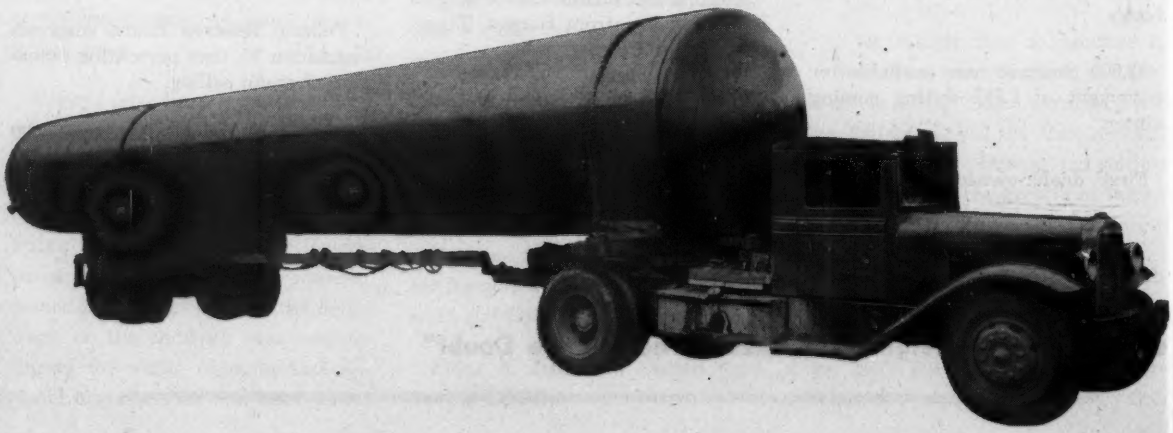
Survey Brings High Returns

A remarkable response of 24.9% returns reveals that in 1953, 40% of the bulk plants making returns will boost their storage capacities. This, projected to total plants means that there will be an increase in nationwide storage facilities of nearly 50,000,000 gallons by the end of this year.

That means big business ahead for the LPG industry in 1953!

Dealers, distributors and producers realize it and they are laying hard cash on the line to back up their opinions.

For several past winters there have been some critical shortages of L. P. gas in limited areas which happened to be adversely situated to receive fuel shipments normally due. The railroad switchmen's strike accounted for some hardship one year. Winter blizzards, tank car shortages and lack of sufficient distributor storage at strategic points have contributed to emergencies affecting a certain number of users.



To overcome any possibilities of this happening again, producers, bulk plant owners and the railroads have planned diligently. More aboveground storage, spread over the whole country, has seemed to be the most practical answer.

Possibly the best criterion of annual growth in our industry is reflected in the increase of bulk plant capacity. Bulk plants expand only to care for increased demand.

More Storage and More Prosperity

That means that the bulk plant operators visualize prosperity ahead in terms of greater consumer demand than ever before—a demand which they must be prepared to handle with dispatch, and also with economy. This they can do only when proper storage facilities are available.

One-third of the bulk plants increasing capacity this year will add 30,000 gallons to their present storage; another 15% will add 18,000 gallons; 9% will add 10,000 gallons and 7% will boost their present facilities by 6000 gallons.

East of the Mississippi, 66% of the plants adding storage will put in 30,000 gallons or more. In the Western states approximately 60% of the increases are 18,000 or less. The favored increases in the West are for 5000, 6000, 10,000, 12,000, 15,000 and 18,000 gallons.

The conclusion to be drawn from this is that in the Western states where bulk storage by a majority of the dealers is accepted, the increases planned for this year are evidently to bring up their capacities in keeping with the expected increase in business.

In the eastern states the larger increases per plant evidently show an awakening recognition of the need to bring bulk storage up to the Western averages as well as to handle expected fuel volume.

Table 1 reveals interesting sectional breakdowns of these figures.

These figures are the more remarkable because of the huge underground storage program that already has reached such large proportions. Six of the firms replying verified underground projects for '53 totaling 12,000,000 gallons, or an average of 2,000,000 gallons per plant.

As more and more underground caverns are prepared by the producers for LPG, surface storage will not be as imperative a need for distributors. But it is needed now, and the large aboveground storage planned shows how confident the distributors are that fuel demands will step up briskly this year.

TABLE 1.

Area	Percent of Plants Adding Storage in 1953	Gallonage Increase Projected to Total Plants
New England	17%	498,000 Gallons
Middle Atlantic	31%	3,401,000 "
South Atlantic	38%	6,754,000 "
East North Central	42%	5,102,000 "
East South Central	40%	3,775,000 "
West North Central	32%	8,994,000 "
West South Central	47%	9,959,000 "
Mountain	48%	3,076,000 "
Pacific	42%	8,000,000 "
Total		49,559,000 Gallons

4,110,000,000 Gallons Sold in '52

By **Geo. R. Benz, Manager,**
Engineering Department,
and **P. W. Tucker, Technical Rep.,**
Engineering Department,
Phillips Petroleum Co.

SALES of liquefied petroleum gas continued to increase in 1952, although the rate of increase was less than that for the previous year. The future outlook continues to appear excellent.

Highlights

Sales of L. P. gas in 1952 are estimated at 4,110,000,000 gallons or 6.7% more than the 1951 volume. This is exclusive of the estimated 400 million gallons used for the manufacture of synthetic rubber components.

While this is in contrast with annual gains of 25% to 30% recorded in recent years in the industry, it is greater than the gain in 1949.

The outlook is for increased production, storage, and transportation in 1953 and consequently continued gains in sales.

Domestic and motor fuel use of L. P. gas is estimated to have gained 226,000,000 gallons, or 9.2%.

Industrial and miscellaneous uses gained an estimated 2.1%.

Gas manufacturing use dropped about 5.7%.

Chemical use was up 4.9%.

Bulk distribution trend continues and motor fuel use is expanding. Increased production and more underground storage seen for 1953.

L. P. gas now represents almost half of all liquids produced at natural gasoline plants.

Domestic and Motor Fuel

Estimated sales of L. P. gas for domestic and internal combustion engine fuel purposes in 1952 are estimated at 2,683,000,000 gallons. This represents an increase of 9.2% over 1951 sales in this category, or almost twice the amount sold by the entire industry in 1946 for all purposes.

Weather in most areas, again, played a vital role in the domestic and motor fuel sales of L. P. gas. The country, with the exception of the upper Midwest states, experienced a very mild year, with above-normal temperatures prevailing during the late winter of '51 and the early winter season of '52. This was responsible to a large extent for the less than normal rate of increase.

The "National Committee for LP-Gas Promotion" continues its good work with nearly three-fourths of a billion advertising messages delivered into homes thus far, exclusive of "pass on" readership, In addition, its employe training and promotional activities showed substantial gains during the year. The National Committee is sponsored by the three segments of the industry—the producer, the distributor-dealer and appliance

GEO. R. BENZ

P. W. TUCKER

manufacturer through the Natural Gasoline Association, the Liquefied Petroleum Gas Association and the Gas Appliance Manufacturers' Association, respectively.

During 1952 an estimated 435,000 ranges were shipped for use with L. P. gas. With the greater use of the universal type valve by appliance manufacturers it is becoming increasingly difficult to accurately estimate those ultimately used on L. P. gas. It is interesting to note that the ratio of gas ranges to electric ranges increased from 1.6 in 1951 to almost 2.0 during the first six months of the year. The LPG industry, like many other industries today, is in a buyer's market and this emphasizes the necessity for increased sales effort. Appliance sales necessarily precede new gas loads.

Automatic L. P. gas water heater sales are estimated at 266,000 units which represents an increase over last year. Shipments of floor, space and wall-type furnaces continue to represent about 20% of the total production of this type of gas-fired appliances.

The trend toward bulk distribution of LPG continues at an accelerated rate, with house heating pacing the demand. In the bulk distribution field there is also a trend toward the installation of larger storage tanks which will help smooth out winter deliveries. This trend must continue.

Consumption of L. P. gas as a motor fuel in 1952 rose an estimated 25% over the 1951 volumes. Increased consumption by trucks, buses and farm tractors, many of which were converted to LPG usage during 1951, accounted for a major portion of this increase. The severe drought in the Southwest resulted in greatly increased use of irrigation pumps, many of which are powered by LPG-fueled engines.

While actual figures are not available, sales of factory equipped L. P. gas fueled tractors reached a new high with six manufacturers now producing models. Preliminary reports indicate that LPG carburetion conversion kit sales are down for this year as compared to 1951. Sales of conversion kits in the first six months of 1952 are about 65% of the sales in the first six months of 1951. However, it is expected that the number of conversions made this year will compare very favorably with those made last year. It is felt that many of the kits sold last year were for dealer stocks. This is born out by the indication that carburetion kit sales in the Southwest are slightly

MARKETED PRODUCTION OF LP-GAS

Year	Total Sales Gallons In Thousands	Per Cent Increase	(000 omitted) Domestic and Motor Fuel (1)	Per Cent Increase	Industrial, Misc. (2)	Per Cent Increase	Gas. Mfg.	Per Cent Increase	Chemical Mfg.	Per Cent Increase
1922	223									
1923	277	24.4	Sale of Liquefied Petroleum Gas Confined Primarily to Bottled Gas Business Prior to 1928							
1924	376	36.0								
1925	404	7.2								
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600		400		1,500			
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7		
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0		
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6		
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9		
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	-14.3		
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	-24.3		
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4		
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6		
1937	141,400	32.6	40,823	36.0	62,610	(3)	11,175	19.3	26,792	
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	-16.7
1940	313,456	40.2	134,018	53.1	124,482	32.8	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.6	197,179	14.2	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.6	237,396	20.4	37,519	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.2	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	256,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	-1.1	86,660	61.0	311,499	38.8
1947	2,008,262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414,267	33.0
1948	2,511,160	25.0	1,473,289	28.1	275,883	0.6	237,638	40.3	524,350	26.6
1949	2,658,749	5.9	1,627,550	10.5	247,103	-10.4	239,210	0.6	544,886	3.9
1950	3,254,082	22.4	2,022,464	24.3	355,456	(4)	251,694	5.2	624,468	14.6
1951	3,852,411	18.4	2,456,804	21.6	269,408	(4)	281,692	11.9	844,507	35.3
1952	4,110,000	6.7	2,683,000	9.2	275,000	2.1	266,000	-5.7	886,000	4.9

(1) Household use plus other requirements by these customers such as irrigation pumping, tractor fuel, flame weeding, chicken brooding and similar uses. Included also is L. P. gas sold by domestic distributors but used for industrial purposes, internal combustion engine fuel and for gas manufacturing purposes. Included also, in 1951 and 1952 only, is L. P. gas sold direct by producers and marketers solely for fueling internal combustion engines. (See special note.)

(2) For all years prior to 1951, include L. P. gas sold for fueling internal combustion engines. (See special note.)

(3) Not comparable due to segregation of chemical manufacturing.

(4) Not comparable due to change in method of reporting L. P. gas sold for fueling internal combustion engines.

REMARKS: In this table total sales for all years except 1952 were obtained from U. S. Bureau of Mines reports. Distribution for the years 1931 to 1951, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all L. P. gas (propane, butane and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane, when sold for any purpose other than motor fuel blending, was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor gasoline purposes.

Intercompany sales transactions such as purchases of L. P. gases by one company from other companies and resold as L. P. gases have been eliminated in order to avoid duplication of sales figures.

The data do not reflect sales of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline or their components.

Above: Typical of nearly 5000 bulk plants, each bringing city gas conveniences to customers everywhere. Below: Both bulk distribution and tractor use of L.P. gas show substantial gains in 1952.

higher this year than last year. In this area dealer stocks were built up in previous years.

The tax on fuels for highway use was partially equalized by the application of $0.02 per gallon federal tax on diesel fuels for this purpose on Nov. 1, 1951. However, there is still no federal tax on diesel fuel used in "off highway" equipment although L. P. gas has always been subject to the federal tax when used as motor fuel in other than stationary engines, rail cars and farm tractors. This tax inequality is a severe limitation on the use of L. P. gas in such equipment as mine trucks and construction machinery and should be corrected.

Substantial gains in the "domestic use" have been registered through great interest in and use of L. P. gas for crop dehydration and tobacco curing.

Industrial Use

Sales for industrial and miscellaneous purposes totalled an estimated 275,000,000 gallons at year's end, an increase of 2.1% over 1951. There were two major factors which affected industrial sales. These were the steel strike and the extension and expansion of natural gas lines. The steel strike curtailed steel processing and fabrication which, in turn, reduced the amount of L. P. gas necessary for process heating or treating. The extension and expansion of natural gas mains has the obvious effect of fuel replacement; however, such extended use of natural gas does open up the way for increased use of LPG for "standby" purposes.

Utility Use

Sales of L. P. gas for gas manufacturing purposes are estimated at 266,000,000 gallons—a decrease of about 5.7% compared to preceding year. There are three main factors contributing to this decrease. These include: (1) mild weather, (2) extension and expansion of natural gas lines, and (3) the steel strike. Many utilities entered the year with their storage full and, with the mild weather, were not required to use the usual amount. The steel strike reduced industrial activity and consequently gas consumption in many locations. The extension and expansion of the natural gas lines resulted in some replacement of L. P. gas with natural gas. The extended use of natural gas offers good possibilities for increased sales of L. P. gas for peak shaving and standby purposes.

As 1952 closed there were several hundred towns served by about 366 city gas companies using L. P. gas as base material in gas manufacture, peak shaving, enriching, or for standby in 39 states and 3 provinces of Canada.

Chemical Manufacture

The sale of L. P. gas as a raw material for the manufacture of chemicals and chemical intermediates still continues strong. An estimated 886,000,000 gallons were sold for this use, representing a 4.9% increase over last year.

This increase would have been greater had the steel strike not delayed completion of several large plants scheduled to come "on stream" during the summer or early fall. Other factors leading to the comparatively small increase in 1952 were the increased interest in ethylene from refinery streams, and in ethane, from both refinery and natural gas streams, as a base stock for the production of ethylene through cracking processes. In addition, the refinery strike in May curtailed deliveries to some chemical plants.

One large installation for the recovery of ethane, propane, butanes and heavier hydrocarbons from natural gas "in transit" commenced operation this year, with a still larger installation scheduled to start operation early in 1953. In both of these plants, ethane will be extracted for use as raw material for chemical manufacture, and the propane, plus that amount of the butanes that cannot be blended into motor fuel, will be sold as L. P. gas.

The trend towards using ethane, rather than propane or butane, for chemical manufacture will undoubtedly continue. However, because the problem of transportation of ethane or ethylene over the road in refrigerated vessels or on water in refrigerated barge tanks is not completely worked out, it is necessary that a plant using these lighter hydrocarbons either: (1) move to the source or (2) move close to a pipe line where these hydrocarbons may be extracted.

The use of L. P. gases as raw material for the manufacture of synthetic rubber components increased an estimated 6.7% to a total of 400 million gallons for the year. With the development of synthetic rubber superior in many respects to natural

(Continued on Page 128)

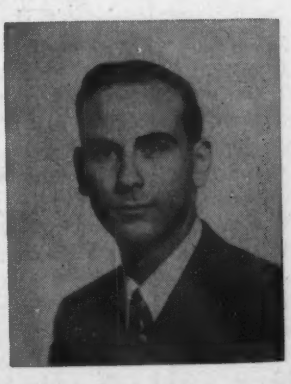
BPN exclusive

How to Speed-Up Fuel Deliveries

Small Changes in Pump Discharge Line Will Influence Transfer Rate. Seven Units That Perform Vital Functions

By Lawrence W. Smith

Smith Precision Products Co.
South Pasadena, Calif.



THIS article is written for the benefit of the operators of delivery trucks and stationary dispensing systems. Our purpose is to show how it is often possible to make small changes in the pump discharge line that will allow a considerable speed-up in the delivery rate. We also want to show how to design new systems for the very fastest pumping.

To do this, we will present tables giving the pressure drop (resistance-to-flow) across various parts of pump delivery lines; we will explain the significance of these tables; and we will show how these tables can be used for estimating delivery rates in dispensing systems.

There are seven important parts or units in the pump discharge line that affect the delivery rate. These are all illustrated in the accompanying Figure A, and may be listed as follows:

Unit 1. Meter (12).
Unit 2. Back-pressure valve (14).
Unit 3. Valve on meter end of hose, if used (35).
Unit 4. Hose (16).
Unit 5. Valve on delivery end of hose (28).
Unit 6. Tank filler valve (36).
Unit 7. Back-pressure built up in tank when vapor return line is not used.

Other items, such as the short lengths of piping normally used in discharge lines, or the elbows, tees, and other simple fittings, can be neglected, as their effect is small in comparison with the items listed. Let us take up the above seven units one by one in the discussion to follow.

1. Meter (12 on drawing)

(Table numbers refer to corresponding paragraph numbers.)

TABLE 1

Resistance-to-flow of Average 5 to 30 GPM Meters Sold for LPG Service

Delivery Rate GPM (Gallons per minute)	Meter Resistance psi (Pounds per square inch)
5	0.5
10	1.0
15	1.5
20	2.0
25	2.7
30	3.5

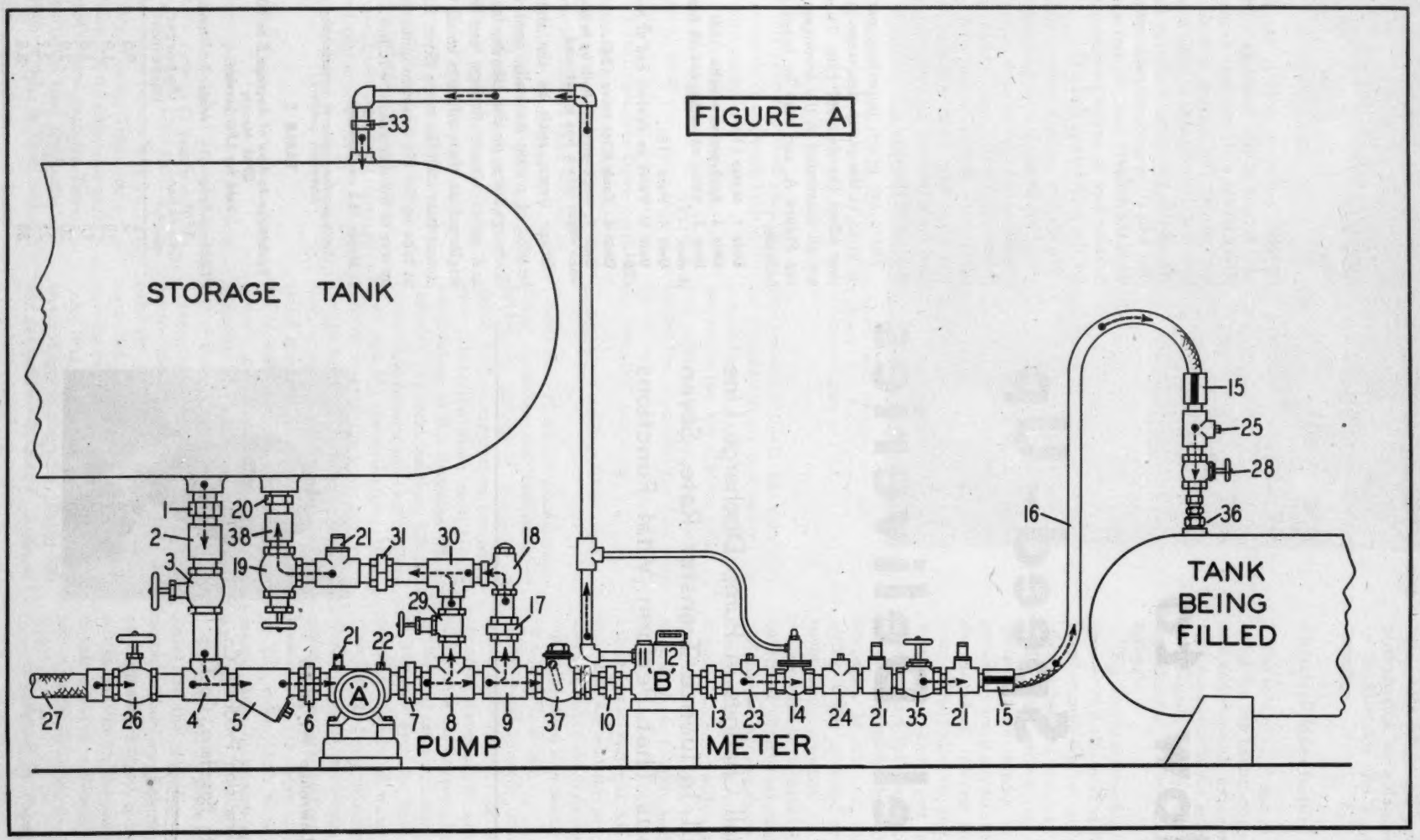


FIGURE A
STORAGE TANK
TANK BEING FILLED
PUMP
METER
'A'
'B'
33
1
2
3
20
38
19
21
31
30
18
29
17
22
16
15
25
28
36
27
26
4
5
6
7
8
9
37
10
11
12
13
23
14
24
21
35
21
15

FIGURE A.

Description of Figure A.

Figure A shows a basic LPG pumping system designed for delivery trucks and also stationary plants where fuel tanks on motor vehicles, cylinders, trailer tanks, and the like are filled. This system may look somewhat complicated, but it is not costly and there is a very good safety or convenience reason for every item shown. It has been designed in accordance with the recommendations of the new ASME-API Code for "Installation, Proving, and Operation of Positive Displacement Liquid Meters in Liquid Hydrocarbon Service," and also takes advantage of the engineering principles important to pump installation, to assure longest pump life and fastest delivery. It is assumed that the thermometer well and vapor-eliminator check valve recommended by the meter code are built into the meter. When meters not having this desirable equipment are installed, these parts may be added as separate installation features.

Arrows indicate the direction of fluid flow, as follows:

To fill tanks: Liquid flows out of storage tank through excess-flow valve 1, coupling 2, shut-off valve 3, tee 4, strainer 5, union 6, and into pump "A". Pump develops the necessary delivery pressure and pushes liquid into tank to be filled through union 7, tee 8, tee 9, check valve 37, union 10, meter strainer 11, meter 12, union 13, tee 23, back-pressure valve 14, tee 24, tee 21, shut-off valve 35, tee 21, hose couplings 15, hose 16, tee 25, shut-off valve 28, and filler valve 36. Shut-off valves 26 and 29 are left closed. Valves 3 and 26 are preferably plug or gate types with low resistance-to-flow. All other shut-off valves can be globe or angle types if desired.

Bypass valve: If pump builds up an excessive pressure, bypass valve 18 opens, allowing enough of the liquid pumped to return to the storage tank to relieve pump strain. This bypassed liquid comes out of tee 9 and runs through union 17, bypass valve 18, tee 30, union 31, tee 21, shut-off valve 19, coupling 38, and excess-flow valve 20 to storage tank.

To fill storage tank from transport truck or RR tank car: Connect liquid hose 27 and vapor return line (not shown). Liquid flows through hose 27, shut-off valve 26, tee 4, strainer 5, and union 6, to pump "A". Pump fills storage tank by pushing liquid through union 7, tee 8, opened shut-off valve 29, tee 30, union 31, tee 21, shut-off valve 19, coupling 38, and excess-flow valve 20. Shut-off valves 3 and 35 are left closed.

For best operation with a Smith pump, bypass valve 18 is set at about 75 pounds. For proper settings with other makes of pumps, consult the manufacturer. Fittings at positions marked 21 (4 pieces) are pop-off relief valves placed to relieve any hydrostatic pressure that might build up between closed shut-off valves when the system is not in use. Place ¼" pipe plugs at points 22, 23, 24, and 25. These are test places for inserting pressure gages which will help greatly in trouble-shooting if difficulties develop in the system after it has seen considerable service. See pages 98, 100, and 104 in "Butane-Propane News," September, 1951, for further details on this testing, or write for reprints of the article to Smith Precision Products Co.

Many modifications to this installation can be made to suit service conditions. The drawing is as complete as possible, but does not show everything that could be desired by all users. The storage tank is of the horizontal type, but spherical or vertical tanks are just as satisfactory if mounted as high above pump level. The meter outline is purely schematic, and is not intended to resemble any particular make. This layout should work very well with any type of pump or meter.

Note how the amount of pressure absorbed by the meter is very low, only 3.5 psi even at the full 30 GPM recommended maximum flow rate. These figures apply only when the meter strainer is clean. If the strainer becomes clogged with dirt or other foreign matter, the resistance-to-flow or pressure drop will be much higher, and this will slow the delivery rate. Therefore, check your meter strainer periodically to be sure it is kept clean.

2. Back-Pressure Valve (14 on drawing)

There are two general types of back-pressure valves in service, the spring-loaded type and the diaphragm type. Both types sometimes come with the meter, and are sometimes sold and installed separately. The spring-loaded valve may be set to from 10 to 50 or more pounds. A setting of 15 pounds is common with those supplied by a meter manufacturer as a part of his metering assembly.

In any case, *the resistance-to-flow (pressure drop) of a spring-loaded back-pressure valve is equal to its setting.* Diaphragm type valves may be set to from 5 to 25 or more pounds, with a 10-pound setting recommended by us as being adequate. The *resistance-to-flow (pressure drop) of a diaphragm type back-pressure valve is practically zero* if it has a setting below 15 pounds[1], and thus it may be neglected in any calculations on common types of dispensing systems such as shown in the diagram, Figure A.

3. Valve on Meter End of Hose (35 on drawing)

As in the case of the meter, the amount of pressure absorbed by the resistance of these valves is small.

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[1]In practice with most dispensing systems, a diaphragm-type, back-pressure valve set to 10 pounds remains wide open during most of the delivery. This is because the pressure drop of the other equipment downstream will total more than the 10-pound setting of the valve. This type of valve is designed to open whenever the pressure in the discharge line exceeds tank pressure by 10 pounds.

For a detailed description of both types of back-pressure valves and their uses in accurate metering, see article "Accurate Metering of Butane and Propane" in the September, 1947, issue of the "Butane-Propane News," or write for reprints which are available free of charge from the Smith Precision Products Co.

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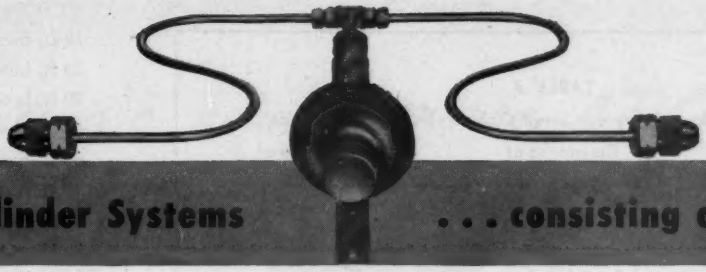

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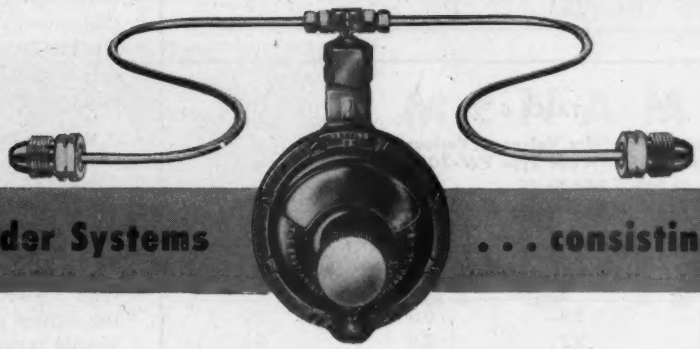

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TABLE 3

Resistance-to-flow of Average Small Globe Valves in LPG Service

Delivery Rate GPM	Resistance of ¾" Valve, psi	Resistance of 1" Valve, psi
5	0.2	0.1
10	0.6	0.3
15	1.3	0.7
20	2.1	1.2
25	3.1	1.9
30	4.5	2.8

TABLE 4[2]

Resistance of 50 ft. Lengths of LPG Delivery Hose of Various Sizes and at Various Flow Rates

Delivery Rate GPM	Resistance-to-flow, psi		
	½" Hose	¾" Hose	1" Hose
5	8.3	-	-
10	30.5	4.1	-
15	68.0	8.7	4.1
20	too high	14.8	7.0
25	too high	22.1	10.5
30	too high	31.8	15.0

TABLE 6

Resistance of Tank Filler Valves at Various Flow Rates, with and without Parkhill-Wade Type PW-200 Safety Fill Nozzle

Delivery Rate GPM	Resistance-to-Flow, psi			
	1¼" Filler Valve	¾" Filler Valve	Special 1¼" Filler Valve with PW-200 Nozzle	Special ¾" Filler Valve with PW-200 Nozzle
5	0.4	2.9	0.9	2.1
10	2.0	9.2	2.5	6.8
15	2.8	20.0	4.7	16.0
20	4.5	35.0	8.3	28.0
25	6.8	too high	13.0	too high
30	10.0	too high	18.5	too high

[2]This table was calculated from viscosity figures of propane and butane at 60° F. temperature, as given in Table 9 on page 34 of "Handbook Butane-Propane Gases, Third Edition." The procedure followed in the calculations was as outlined on pages 211 and 212 of Daugherty's "Hydraulics, Fourth Edition." The resistance of hoses carrying propane or butane was found to be so nearly the same that an average figure was placed in the table and it can be used for straight butane, isobutane, propane, or any LPG mix with good results. The resistance of hose is assumed to be equivalent to that of clean steel pipe of the same inside diameter, and this assumption is in accordance with the statement of a hose manufacturer's representative.

One-half inch size valves have considerably more resistance, and their use is not recommended. In some cases there is no valve in this position, although it is recommended as a shut-off point for added safety in case the hose is accidently ripped or broken, particularly where the back-pressure valve is of the spring-loaded type. Note how the resistance of these valves increases as the delivery rate increases.

4. Hose (16 on drawing)

For lengths of hose different than 50 feet, multiply figures in Table for hose by the following factors:

10 ft. hose	0.2
20 ft. hose	0.4
30 ft. hose	0.6
40 ft. hose	0.8
60 ft. hose	1.2
70 ft. hose	1.4
80 ft. hose	1.6
90 ft. hose	1.8
100 ft. hose	2.0

Note that a 50-ft. length of hose may easily have a considerable resistance. For example, a 50-ft. length of ½" hose carrying a delivery rate of 15 GPM develops a resistance of 68 psi, making this size very poor for fast delivery. The use of ¾" hose is therefore recommended, and 1" hose represents a further improvement wherever it can be installed.

A hose of unnecessary length needlessly penalizes the operator by slowing delivery. A hose too small in diameter does the same thing. Have your hose long enough to reach the tanks conveniently, but not so long that several coils always stay on the truck. Get the ¾" size and if the driver can handle the extra weight easily, a 1" hose is still better.

5. Valve on Delivery End of Hose (28 on drawing)

This may be another standard globe valve like No. 35 on the drawing, in which case the figures in Table 3 apply. If you have a Parkhill-Wade type PW-200 Safety-Fill Nozzle, use the figures shown in Table 6. Other special types of valves, such as the quick-closing ball and plug types, usually have smaller resistance values. Figures can ordinarily be obtained through the manufacturer's representatives, as required.

6. Tank Filler Valve (36 on drawing)

Some of the above figures are averages of several tests and are not 100% accurate for any valve number or manufacturer. The values given should be used as guides only, but will be found reliable enough for most purposes. Note how the ¾" size filler valve has much more restriction than the 1¼" size. The ¾" size should never be used on any but the smallest tanks, as its greater resistance represents a loss of delivery time that mounts to a considerable total when deliveries of over 100 gallons are made. It is almost impossible to force as much as 20 gallons per minute through a ¾" filler valve

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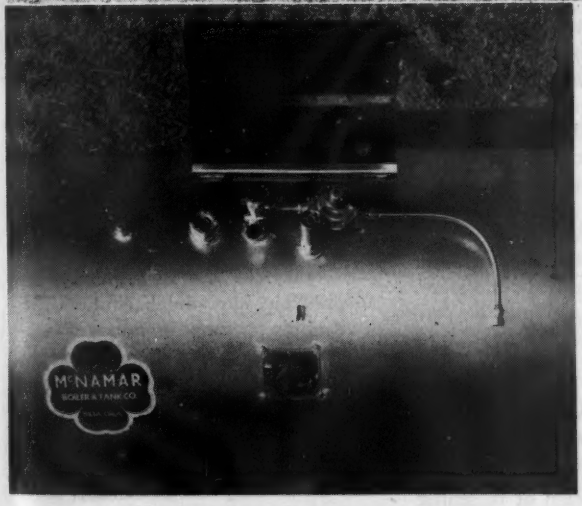

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7. Tank Back Pressure

Considerable time has been spent in making up Table 7, which attempts to show the amount of back pressure that is developed in a consumer tank when it is filled without the use of a vapor return line. The back-pressure values given, which are found to vary depending on the temperature of the day and the type of fuel handled, are the same for *any size tank* that is filled from an almost empty to a completely full condition (*i.e.*, safe level). The figures in the table thus apply equally well to 100-pound cylinders, 1000-gallon tanks, and everything in between.

The back pressure built up when filling tanks without a vapor return line is one of the most important items in slowing the delivery rate to below that normally expected. From the standpoint of faster pumping only, it would be desirable to use a vapor return line to reduce this back pressure, and some pump manufacturers recommend this.

However, it is recognized by all metering authorities throughout the country that the vapor returned through a vapor return line causes inaccurate metering, as it is not accounted for in the measurement of the fuel delivered[3]. The inaccuracy involved through the loss to the customer of fuel returned through a vapor return line may run as high as 5% (one gallon in every 20) when propane is delivered on a hot day.

Of course, in the interest of good customer relations, such errors cannot be tolerated. For this reason, pumps capable of making fast fuel deliveries without the aid of a vapor return line are performing a very valuable service; less efficient pumping units should be replaced.

When filling any tank without a vapor return line, whether it be a 100-pound cylinder or a 1000-gallon storage tank, the vapor originally in the tank must be collapsed into liquid during the filling operation. This "collapse" takes extra pressure to accomplish, as when vapor is compressed into liquid it generates a considerable amount of heat. The amount of heat given off depends upon the temperature of the vapor when it collapses.

Now, during a fast filling operation there is not enough time for much of this heat to be radiated away through the tank walls to the atmosphere outside. Hence, the temperature of the vapor in the tank increases rapidly, and the increased temperature brings on an increase in pressure. This pressure increase, or back pressure, slows delivery. Thus it is important to dissipate the heat in the vapor space as much as possible. Ideally, some means should be provided to assure that the hot liquid and vapor *at the liquid level* be thoroughly mixed with the cooler liquid underneath, so as much heat as possible might be dissipated.

When a 100-pound cylinder is filled, the fast moving stream of incoming liquid hits the liquid level quite violently, causing much splashing and turbulence which effectively mixes the heat in the vapor space. However, in a larger tank, the area at the liquid level has a greater size, the incoming stream of liquid moves more slowly, and thus there is less turbulence with a reduced tendency for mixing. The worst possible case would be a large tank which is filled through a dip tube, so the incoming liquid actually enters through the bottom of the tank. Here there could be almost no mixing of the heated vapor, and a high back pressure would certainly be built up.

TABLE 7

Amount of Back Pressure Built Up in Tanks Filled without Vapor Return Lines

Type of Fuel	Temperature (°F.)	Back Pressure, psi	
		Case 1, 100% Heat Mixed	Case 2, 25% Heat Mixed
Propane	100°	31.1	124.4
Propane	70°	16.9	67.6
Propane	40°	8.9	35.5
Propane	10°	4.1	16.3
Propane	−20°	1.6	6.4
Butane	100°	3.8	15.1
Butane	70°	1.8	7.2
Butane	40°	0.8	3.1

Table 7 shows the amount of back pressure built up in tanks filled without vapor return lines, for two cases: (1) where 100% of the heat generated by the collapsing vapor is thoroughly mixed with the liquid in the tank, and (2) where only 25% of the heat generated is mixed. In most cases, actual fillings will be somewhere between these two extremes. Case 1 represents perfection in mixing, and perfection is always difficult to attain in anything; case 2 illustrates our estimate of the worst effect of filling large tanks through dip tubes, which we believe is also uncommon.

Back Pressure Affects Speed

Note how butane fuel develops much less back pressure than propane, even at the higher temperatures. Note how the back pressure built up by propane at summer temperatures can be very high under bad mixing conditions; so high, in fact, that no pump now made could build up enough pressure to completely fill such tanks at any reasonable delivery rate. Extremely bad conditions such as this are rarely met, but the effect of the back pressure developed is certainly important, and has a great effect on pumping speed.

Distributors of an LPG mixture can estimate back pressure by averaging the figures in Table 7 for straight butane and straight propane. For example, for a 60-propane, 40-butane mix, case 1, 70°, take 60 x 16.9 = 1014, and add this to 40 x 1.8 = 72, giving a total of 1086. Then divide this number by 100, giving an estimated back pressure developed with a 60-40 mix of 10.86 psi.

The figures tabulated in the pre-

[3]Refer to paragraph 1054 on page 14 of the new "ASME-API Code for Installation, Proving, and Operation of Positive Displacement Meters in Liquid Hydrocarbon Service". This book is on sale for $2 by the American Petroleum Institute, 50 West 50th St., New York City, and is a valuable guide for interested meter users, having been prepared with the help of prominent men in the industry. Also, see pages 2 and 14 in Operating and Maintenance Manual No. 717, published by the Neptune Meter Co.

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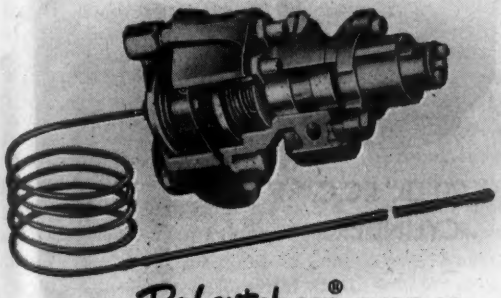

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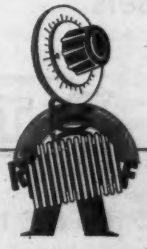

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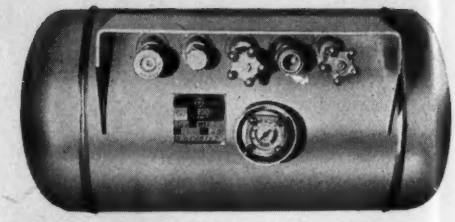

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ceding tables now make it possible to estimate and improve pump delivery rates, as the following questions and answers will show:

Question I: We have a propane delivery truck equipped with one of your 50 GPM pumps and piping exactly as shown in Figure A. The by-pass valve is set to 75 psi in accordance with your recommendations. We use a meter having a built-in spring-loaded back-pressure valve set at 15 pounds, two hose valves as shown, one 50-foot length of ¾" delivery hose, and most of our tanks have 1¼" filler valves. We are now getting only 20 gallons per minute delivery, which seems very little for a 50 GPM pump. Is anything wrong, and can you tell us how to check this delivery, using the tables in this article?

Answer I: First refer to the tables and add up the values for back pressure (resistance-to-flow) that each item in the system requires. We have:

1. Back pressure of meter (Table 1) at 20 GPM	2.0 psi
2. Back pressure of back-pressure valve, spring loaded type	15.0 psi
3. Back pressure of first hose valve, ¾" (Table 3) at 20 GPM	2.1 psi
4. Back pressure of hose, ¾" (Table 4) at 20 GPM	14.8 psi
5. Back pressure of second hose valve, ¾" (Table 3) at 20 GPM	2.1 psi
6. Back pressure of filler valve, 1¼" (Table 6) at 20 GPM	4.5 psi
7. Back pressure of tank (assumed propane at 70°, twice as bad mixing as Case 1), 16.9 x 2 = 33.8 (Table 7)	33.8 psi
Total Back Pressure	74.3 psi

Since the calculated total back pressure, 74.3 psi, closely equals your by-pass valve setting, 75 psi, we would say that you *are* getting the best possible delivery from this pump in this setup when you get 20 GPM delivered.

Question II: But this rate takes us almost 30 minutes to fill a 500 gallon tank. Can you suggest something that would improve the delivery rate?

Answer II: Yes, we believe you could improve this speed considerably by making a few simple changes. *In answering this question, the whole purpose of this article is clearly demonstrated.* First, take off the spring-loaded back-pressure valve and install the diaphragm type. Second, use a 1" hose and hose valves instead of the ¾" size. Now, assuming an improved delivery rate of, say, 30 GPM, and running through the tables again, we have:

1. Back pressure of meter (Table 1) at 30 GPM	3.5 psi
2. Back pressure of back-pressure valve, diaphragm type	0.0 psi
3. Back pressure of first hose valve, 1" (Table 3) at 30 GPM	2.8 psi
4. Back pressure of hose, 1" (Table 4) at 30 GPM	15.0 psi
5. Back pressure of second hose valve, 1" (Table 3) at 30 GPM	2.8 psi
6. Back pressure of filler valve, 1¼" (Table 6) at 30 GPM	10.0 psi
7. Back pressure of tank (Table 7), same as previous example	33.8 psi
Total Back Pressure	67.9 psi

Note how by making these few simple changes a delivery rate of 30 GPM can be accomplished at a lower total back pressure than was formerly absorbed to deliver only 20 GPM. As a matter of fact, if you have a 30 GPM meter you should now reduce the setting of your by-pass valve from 75 psi to about 65 psi, in order to prevent meter overspeeding. The lower pressure setting of the by-pass valve would make things easier on the pump, and it would have a longer service life. So you see that in this case, merely changing a few valves and putting on a new hose would improve delivery 50%, as well as make the pump wear longer. It would now take less than 20 minutes to fill the 500 gallon tank.

WARNING: The reader must not draw the conclusion from these examples that the same changes on his own truck will make the same improvement in delivery rate. Each truck is a separate case and each must be figured individually. Follow the examples using data from your own trucks to calculate your particular problem.

Question III: Since the best delivery we can count on is 30 GPM due to the rating of our meter, would it not be better to use your 35 GPM pump instead of the 50 GPM pump now installed? It would seem that the smaller pump would fit the service better, and the lower initial cost and upkeep expense would be helpful.

Answer III: Our pumps have their capacities rated at zero differential pressure, not at the higher pressures developed when filling small tanks. We have found over the years that any of the models will lose from 3% to 5% of their rated capacity for every 10 pounds differential pressure which they pump against. Thus, our 50 GPM unit actually pumps 50 GPM less the quantity $6\frac{1}{2} \times 2\frac{1}{2}$[4], or only 34-¾ GPM at a differential pressure (back pressure) of 65 psi. A 35 GPM unit would actually pump only 35 minus ($6\frac{1}{2} \times 1\frac{3}{4}$), or 23⅝ GPM against 65 psi back pressure. Thus, the smaller pump does not have the required capacity at the higher pressures, and would not develop the full 30 GPM delivery rate. The smaller pump would, however, be as good as the larger pump in the system as first described, where the delivery capacity of the equipment on the discharge side of the pump was only 20 GPM.

Question IV: As a matter of interest, what would be our delivery rate with a ¾" filler valve in place of the 1¼" valves we normally use, assuming that every other part of the system is improved as in your answer to Question II?

Answer IV: We will probably go right down to a 20 GPM delivery again. Running through the figures, we have:

1. Back pressure of meter (Table 1) at 20 GPM	2.0 psi
2. Back pressure of back-pressure valve, diaphragm type	0.0 psi
3. Back pressure of first hose valve, 1" (Table 3) at 20 GPM	1.2 psi
4. Back pressure of hose, 1" (Table 4) at 20 GPM	7.0 psi
5. Back pressure of second hose valve, 1" (Table 3) at 20 GPM	1.2 psi
6. Back pressure of filler valve, ¾" (Table 6) at 20 GPM	35.0 psi
7. Back pressure of tank (Table 7), same as previous examples	33.8 psi
Total Back Pressure	80.2 psi

Thus we see that it would require a differential pressure of 80.2 psi to force 20 GPM through a ¾" filler valve, in the same system that would handle 30 GPM through a 1¼" filler valve at a differential pressure of only 67.9 psi. This example speaks very plainly in favor of the 1¼" filler

[4]There are 6½ 10's in 65; hence 6½. Five per cent of 50 GPM is 2½; hence $6\frac{1}{2} \times 2\frac{1}{2}$ is 15¼, so a 50 GPM pump loses up to 15¼ gallons of its capacity when working against a 65 pound back pressure. In the figures for the 35 GPM pump 1¾ is 5% of 35 GPM. This pump loses up to $6\frac{1}{2} \times 1\frac{3}{4} = 11\frac{3}{8}$ GPM of its capacity when working against a 65 pound back pressure.

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valve over the ¾" filler valve on large tanks.

Question V: In rugged country such as sparsely populated desert and mountain areas, it sometimes would save time to stop the truck about a hundred feet from the tank to be filled and use a hundred feet of light delivery hose to make the filling connection. Could our drivers get by with ½" hose by improving every other feature of the discharge line as much as possible, and using the better 1¼" size tank filler valves?

Answer V: Let us follow through with another calculation, assuming a flow rate of only 10 GPM, with parts of the discharge line sized as listed:

1. Back pressure of meter (Table 1) at 10 GPM	1.0 psi
2. Back pressure of back-pressure valve (diaphragm type)	0.0 psi
3. Back pressure of first hose valve, ¾" (Table 3) at 10 GPM	0.6 psi
4. Back pressure of hose, ½" (Table 4) at 10 GPM (2.0 x 30.5)	61.0 psi
5. Back pressure of second hose valve, ¾" (Table 3) at 10 GPM	0.6 psi
6. Back pressure of filler valve, 1¼" (Table 6) at 10 GPM	2.0 psi
7. Back pressure of tank (same as previous examples)	33.8 psi
Total Back Pressure	99.0 psi

Thus we see that the use of 100 feet of ½" delivery hose would require a by-pass valve setting of almost 100 pounds, even to attain the very slow delivery rate of 10 GPM. The ease of handling the small-sized hose should be weighted against the time lost by slow delivery and the extra cost of possibly more frequent pump repairs at the higher differential pressure setting.

Question VI: It would help us in deciding upon this type of delivery system if you would show us what improvement would result from the use of 100 ft. of ¾" hose in place of the ½" size we suggested.

Answer VI: Let us see how much pressure would be absorbed by the same delivery system as in the previous example, except that it is now handling 20 GPM and has a ¾" hose:

1. Back pressure of meter (Table 1) at 20 GPM	2.0 psi
2. Back pressure of back-pressure valve (diaphragm type)	0.0 psi
3. Back pressure of first hose valve, ¾" (Table 3) at 20 GPM	2.1 psi
4. Back pressure of hose, ¾" (Table 4) at 20 GPM (2 x 14.8)	29.6 psi
5. Back pressure of second hose valve, ¾" (Table 3) at 20 GPM	2.1 psi
6. Back pressure of filler valve, 1¼" (Table 6) at 20 GPM	4.5 psi
7. Back pressure of tank (still unchanged from previous examples)	33.8 psi
Total Back Pressure	74.1 psi

Thus we see that the mere substitution of 100 ft. of ¾" hose for 100 ft. of ½" hose results in doubling the delivery rate (from 10 to 20 GPM) and lowering pump pressure from 99.0 psi to 74.1 psi (a 25% reduction). The ¾" size hose is highly recommended over the ½" size in any installation.

Question VII: In previous articles we have read that the pump inlet line must also be properly designed in order to attain good delivery rates. Is this still true, or have you now decided that the pump discharge line is more important?

Answer VII: All these tables are based on the assumption that the inlet line is properly engineered so the pump is supplied with all the liquid it needs at all times. Of course, the inlet line is still important. But we must remember that it is foolish to pay attention to one line without also properly designing the other. Neither the inlet nor the discharge line is the full story within itself; attention must be paid to *all* parts of the pump piping.

The article "Transferring LP-Gas with Liquid Pumps" in the July, 1951, issue of "Butane-Propane News" contains tables for calculating your inlet line. This article and the two succeeding articles have been reprinted, and single copies in booklet form are available free of charge from the Smith Precision Products Co.

As a conclusion, we would like to point out that the previous questions and answers have been confined to pump problems connected with delivery trucks. However, the tables and methods that have been explained apply equally well to any piping layout that is substantially the same as that shown in the illustrating Figure A. Systems designed for filling fuel tanks on tractors or on trucks and other motor vehicles are usually very much like this figure. As a matter of fact, this type of piping arrangement is now so widely recommended and used that we have come to call it the *Basic LPG Pumping System.*

The tables and methods shown should apply to any make and type of pump, regardless of its manufacture, as the figures depend not on the pump but upon the individual characteristics of the other parts discussed.

The author wishes to give credit to engineers of the Neptune Meter Co., the Selwyn-Landers Co., and Hewitt-Robins, Inc., who supplied information used in some of the tables.

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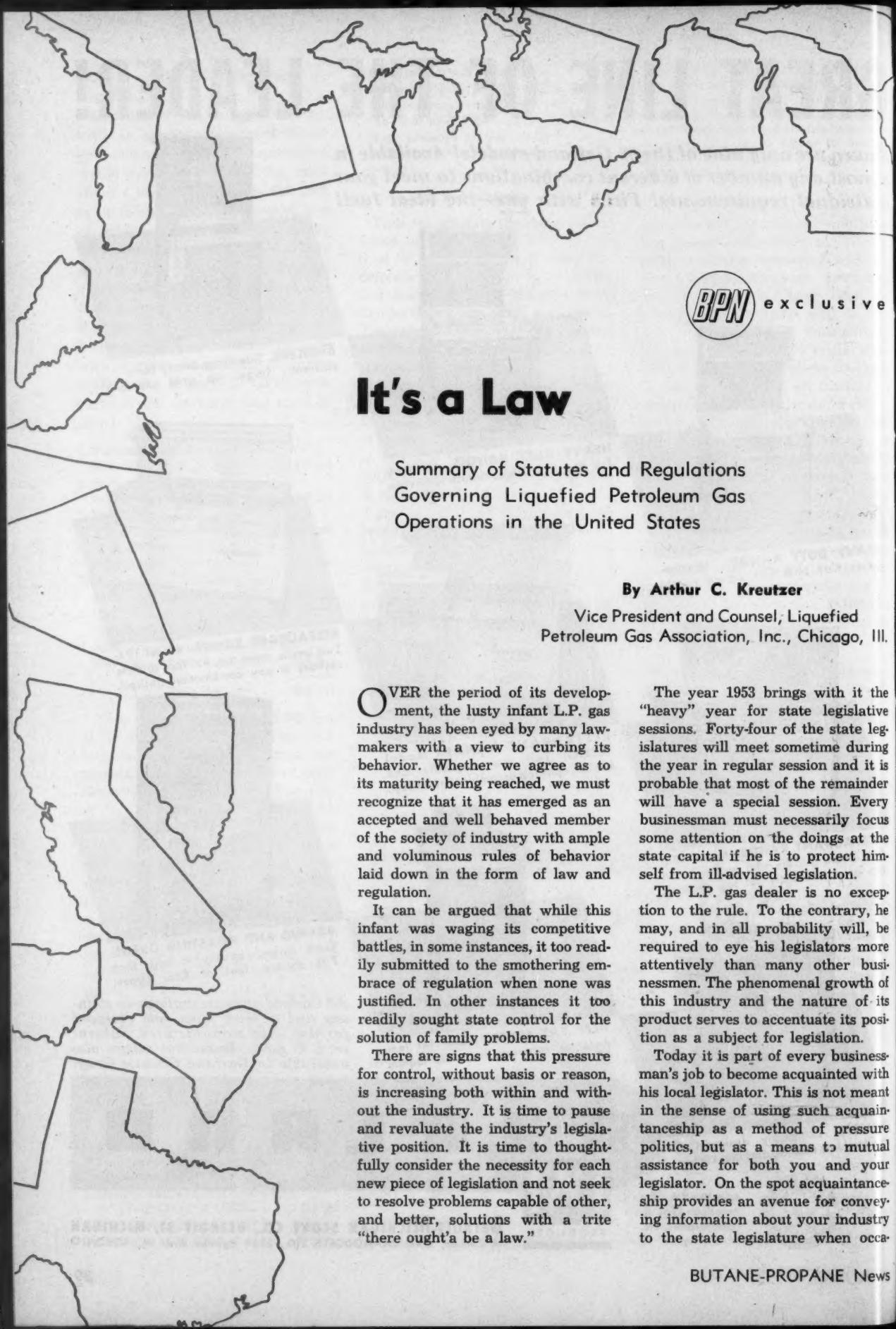

BPN exclusive

It's a Law

Summary of Statutes and Regulations Governing Liquefied Petroleum Gas Operations in the United States

By Arthur C. Kreutzer

Vice President and Counsel, Liquefied Petroleum Gas Association, Inc., Chicago, Ill.

OVER the period of its development, the lusty infant L.P. gas industry has been eyed by many lawmakers with a view to curbing its behavior. Whether we agree as to its maturity being reached, we must recognize that it has emerged as an accepted and well behaved member of the society of industry with ample and voluminous rules of behavior laid down in the form of law and regulation.

It can be argued that while this infant was waging its competitive battles, in some instances, it too readily submitted to the smothering embrace of regulation when none was justified. In other instances it too readily sought state control for the solution of family problems.

There are signs that this pressure for control, without basis or reason, is increasing both within and without the industry. It is time to pause and revaluate the industry's legislative position. It is time to thoughtfully consider the necessity for each new piece of legislation and not seek to resolve problems capable of other, and better, solutions with a trite "there ought'a be a law."

The year 1953 brings with it the "heavy" year for state legislative sessions. Forty-four of the state legislatures will meet sometime during the year in regular session and it is probable that most of the remainder will have a special session. Every businessman must necessarily focus some attention on the doings at the state capital if he is to protect himself from ill-advised legislation.

The L.P. gas dealer is no exception to the rule. To the contrary, he may, and in all probability will, be required to eye his legislators more attentively than many other businessmen. The phenomenal growth of this industry and the nature of its product serves to accentuate its position as a subject for legislation.

Today it is part of every businessman's job to become acquainted with his local legislator. This is not meant in the sense of using such acquaintanceship as a method of pressure politics, but as a means to mutual assistance for both you and your legislator. On the spot acquaintanceship provides an avenue for conveying information about your industry to the state legislature when occa-

ARTHUR KREUTZER

sion arises. This source of information is equally appreciated by the legislature for it cannot be completely informed from personal knowledge and observation on the hundred and one questions that arise in a legislative session. It serves both industry and government if there is a known and reliable source of information.

Parenthetically, it is in acting as an industry watchdog that an association gives one of its most valuable services. Most businessmen have neither the time nor facilities to note legislative approaches that may concern their operations, or to check bills for their implications. Trade associations can and should do this.

For example, LPGA has a reporting service that immediately advises it of the introduction of a bill covering any of a long series of topics that experience has shown may affect L.P. gas operations. This initial report is followed by a copy of the bill and day-to-day reports on its progress. Bills are checked for their effect and the industry alerted to the consequences. Then, as in the case of any proposed law, members of the industry must present their case to their legislator. Your association can again be helpful in furnishing you with past experience, technical information, statistics and other ammunition necessary to advance or defend your position.

You don't need a Gallup Poll to foresee state activity on safety regulation. While most states now have safety regulatory laws, in addition to activity within the states having no law at present, there is always movement in changing existing law. Advance indications are that changes or new safety legislation will be consid-

Recapitulation of State Regulatory Laws

** Regulations formally adopted.* *** Regulations under consideration.*

STATE	BASIC LAW	REGULATORY BODY
Alabama	Act No. 275, Laws of 1951 (Approved July 26, 1951).	*Alabama Liquified Petroleum Gas Commission.
Arkansas	Act. No. 165 of Acts 1947.	*Boiler Inspection Division, Department of Labor.
California	The Labor Code (1937) establishes the Department of Industrial Relations with authorization to promulgate rules and regulations permitting safe working conditions. (Does not cover domestic installations.)	*Division of Industrial Safety, Department of Industrial Relations.
Colorado	House Bill 373 as approved 2-28-45. (In conjunction with H.B. 245, substantially model LPGA law.)	*State Inspection of Oils.
Connecticut	Public Act 243 of 1945 (Section 564h-567h Connecticut Law Supplement 1945) provides for the issuance of "regulations concerning the safe storage and transportation of flammable liquids" by the Commissioner of State Police.	*Commissioner of State Police.
Florida	Senate Bill 520, 1947 Session as amended.	*Insurance Commissioner as ex-officio State Fire Marshal.
Georgia	Act. No. 258, Acts 1949, and Act No. 246, Acts 1949.	*Insurance Commissioner as ex-officio State Fire Marshal.
Idaho	Chapter 39, Session Laws 1949 (LPGA Model Law).	Commissioner of Law Enforcement.
Illinois	Section 9, Chapter 127½, Illinois Statutes gives general powers to the Department of Public Safety regarding the control of fire hazards.	*Department of Public Safety.
Indiana	Chapter 48, Laws 1947, empowers the State Fire Marshal in the interest of public safety to promulgate and enforce rules and regulations for the keeping, storage, use, manufacture, sale, handling, transportation, or other disposition * * * of crude petroleum or any of its products; * * * stoves, heaters, ranges, furnaces, and their construction, location and use; * * * and all heating or burning equipment or devices using any inflammable liquid.	*State Fire Marshal.

STATE	BASIC LAW	REGULATORY BODY
Iowa	Chapter 101, Code of Iowa (1946). (Substantially LPGA Model Law.)	*State Fire Marshal.
Kansas	Chapter 31, Kansas Statutes (1935) (1945 Supplement) provides that the State Fire Marshal shall make regulations for the keeping, storage, use, manufacture, sale, handling, transportation and other disposition of inflammable materials * * * crude petroleum or any of its products.	*State Fire Marshal Department.
Kentucky	Senate Bill 82 of the 1952 Regular Session.	*State Fire Marshal.
Louisana	Section 28, Article VI Louisiana Constitution; Act No. 63, Acts of 1950.	*Louisiana Liquefied Petroleum Gas Commission.
Maine	Chapter 85, Section 42 Revised Statutes of Maine (1944) provide that the Insurance Commissioner shall make regulations relating to inflammable liquids.	*Insurance Commissioner as ex-officio State Fire Marshal.
Massachusetts	Chapter 148, Section 10 G.L., Ter. Ed. as amended gives the Board of Fire Prevention Regulations power to issue safety regulations.	*Board of Fire Prevention Regulations and State Fire Marshal.
Michigan	Public Act 207 empowers the Commissioner of Police to promulgate regulations to safeguard the public from fire hazards (Section 3) covering crude petroleum or any of its products (Section 5).	*Department of Michigan State Police (State Fire Marshal).
Minnesota	Chapter 73, Minnesota Statutes (1945), as amended by Chapter 292, Laws 1949, gives State Fire Marshal power to issue regulations covering the storage, use and transportation of flammable liquids.	*State Fire Marshal.
Mississippi	House Bill 91 of 1948, "The Liquefied Compressed Gas Equipment Inspection Act of Mississippi."	*Motor Vehicle Comptroller.
Missouri	Senate Bill No. 179, 1947 Session, (LPGA Model Law).	*State Inspector of Oils.
Montana	Industrial Accident Board under general enabling act has jurisdiction over places of employment.	*Industrial Accident Board (covering industrial and commercial installations only).

ered in the states of Iowa, Nevada, North Carolina, North Dakota, Oklahoma, Pennsylvania and Utah.

Our industry's aim should be toward assuring laws and regulations that conform to NFPA Pamphlet No. 58, the national standards. The administrative provisions of these laws should be such as are necessary for proper administration and should not stray, in a vain hope for perfection, to a state policing of the industry in fields of economical aspect with no relationship to safety. A safety regulatory law should have as its first purpose creation of safety standards.

Having laid down the ground rules in the form of standards, we look to the state as a referee to enforce these rules. The mechanism of enforcement may exist, and in many states does exist, in the general police activities of the state, the duty owed to all its citizens and taxpayers. In most states having adopted L.P. gas laws these powers adequately exist. It may be that they are not exercised, but this is a problem calling for industry liaison and cooperation with the authorities, not new law.

If additional methods of enforcement are demanded they should be such as are reasonably necessary. Reasonable to the extent that the industry can afford them without unduly damaging its competitive position or financial ability; necessary to the minimum required to see that the industry complies with the rules. A completely paternal system of state policing is not only unnecessary, but from a practical standpoint approaches the impossible. There aren't enough sales dollars in the industry to pay for the elaborate program this would require.

The industry's real hope in the direction of safety is in cooperation with the state official through industry self-policing and in programs of industry personnel training. This is the honest answer.

There is appearing a tendency to turn to the state for economic regulation under the guise of safety. LPGA's board of directors, in a resolution adopted recently, had this to say of one phase:

"WHEREAS, It has come to the attention of the Liquefied Petroleum Gas Association that state authorities have and are considering laws or regulations that would require LP-Gas distributors to have specified minimum amounts of bulk storage; and

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"WHEREAS, It appears to the Board of Directors of the Liquefied Petroleum Gas Association that such laws or regulations are unsound, improper and not to the best interests of either the general public or the liquefied petroleum gas industry for the reason that such laws or regulations:

1. Bear no relationship to safety and distort and confuse true safety regulation.
2. Impose unreasonable and discriminatory treatment upon this industry as contrasted with other fuel supplying industries, having similar distribution patterns and problems.
3. Propose an unfounded and dangerous step in the direction of economic regulation of the industry.
4. Destroy free competition through creation by law of unfair competitive advantages.
5. Create false state trade barriers and a state race for competitive advantage by law.
6. Cannot by the method proposed solve industry problems of distribution and storage.

"NOW, THEREFORE, BE IT RESOLVED, That the Board of Directors of the Liquefied Petroleum Gas Association for the reasons set forth do hereby express this association's disapproval of laws or regulations requiring minimum distributor bulk storage and urge all members of the industry to oppose such measures when presented."

It is also possible that there may be on the legislative agenda perennial attempts to declare this industry a public utility. However, these attempts are fading with a growing realization among state legislators and state agencies that the distribution of L.P. gas is not the same as a public utility operation and you can't make a sow's ear out of a silk purse. As to whether this analogy is well taken, the L.P. gas 1952 Market Report of Curtis Publishing Co. had this to say:

"At the present time, the L.P. gas industry does not come under many of the legislative and governmental restrictions under which the utilities operate, giving it a somewhat favorable legislative position when compared to them. As examples, L.P. gas distributors and dealers can adjust rates in specific areas in order to compete more favorably with other fuels, the utilities cannot. L.P. gas dealers and distributors can set high and low rates in neighboring areas; the utilities cannot. The utilities also operate under a somewhat heavier tax burden than does the L.P. gas industry."

Weights and Measures officials have for some time been viewing our industry with an eye as to whether laws or regulations on this subject were required. Their National Conference sometime ago prepared recommended standards. The states of

STATE	BASIC LAW	REGULATORY BODY
Nebraska	Legislative Bill 234, 1947 Session enumerating general powers of SFM authorized the State Fire Marshal "to promulgate and enforce rules and regulations."	*State Fire Marshal.
New Hampshire	Chapter 251, Laws of 1947.	*Board of Fire Control consisting of five members (one with experience in "the storage of petroleum products").
New Jersey	Senate Bill No. 256, 1950 Session. (LPGA Model Law.)	*Division of State Police.
New Mexico	Chapter 214, New Mexico Session Laws of 1947 as amended by Chapter 122, Law 1949.	*Public Service Commission.
North Carolina	Article 4 of Chapter 119 of the General Statutes (LPGA Model State Law) as amended by House Bill 1340, 1949 Session.	Commissioner of Agriculture.
North Dakota	Title 18, Chapter 18-01, North Dakota Revised Code of 1943 provides that the Commissioner of Insurance as ex-officio fire marshal shall enforce all laws for storage, sale and use of combustibles, make rules for the prevention of fires and gives him the power of abatement of hazards.	*Commissioner of Insurance.
Ohio	Section 835-4, General Code of Ohio.	*State Fire Marshal.
Oklahoma	(1) Chapter 8, Section 421 to 431 inclusive, Oklahoma Statutes of 1941 as amended by House Bill 507, 1945 Session, and Senate Bill 208, 1947 Session. (2) House Bill 150, 1949 Legislative Session.	*State Fire Marshal as ex-officio State Lequified Petroleum Gas Administrator. Liquefied Petroleum Gas Division of three members acts in an advisory capacity.
Oregon	Chapter 375, Laws 1947.	*Commissioner of Labor.
Pennsylvania	House Bill No. 1607, 1951 Session.	*Department of Labor and Industry.
Rhode Island	Chapter 2284 of the Public Laws of 1949.	*Attorney General.
South Carolina	Ratification No. 854, Acts 1952.	*Insurance Commissioner.

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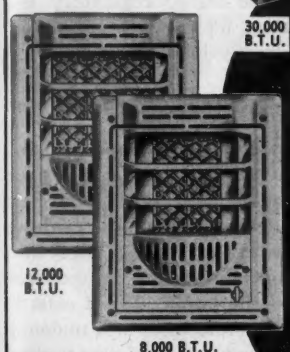

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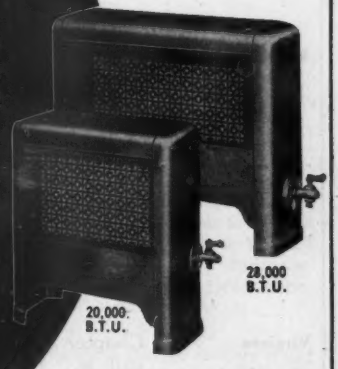

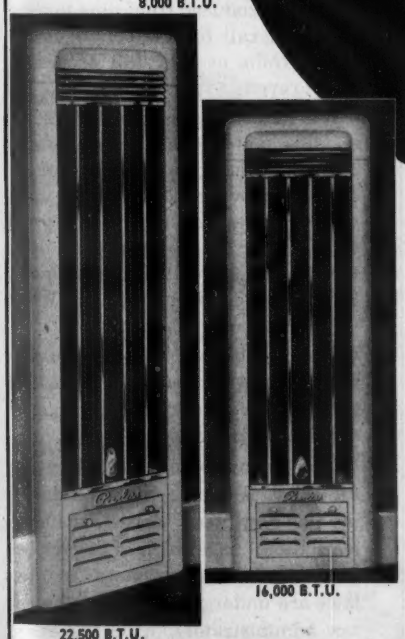

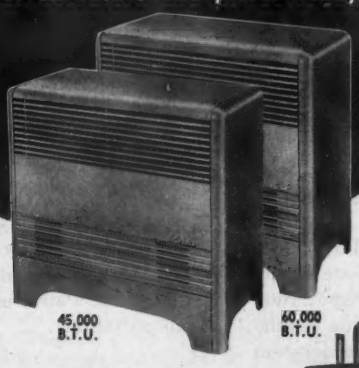

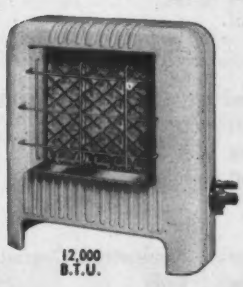

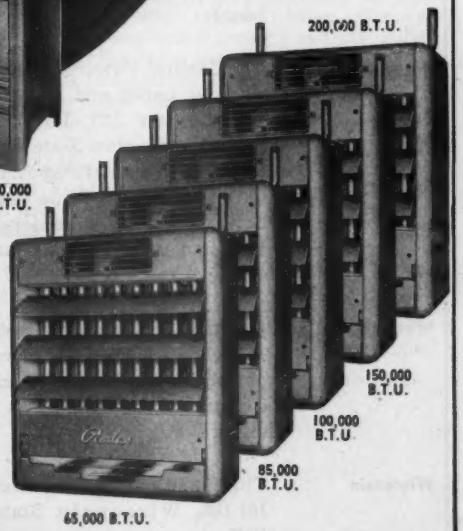

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PEERLESS MANUFACTURING CORP., —— LOUISVILLE 10, KENTUCKY

STATE	BASIC LAW	REGULATORY BODY
South Dakota	House Bill 17, 1947 Session (LPGA Model State Law).	*State Fire Marshal.
Tennessee	Chapter 191, Public Acts 1947, empowers the State Fire Marshal to make regulations covering the keeping, storage, use, manufacture, sale, handling, transportation or other disposition * * * of crude petroleum or any of its products * * * the materials, installation, and use of facilities, equipment, devices and appliances, conducting, conveying, consuming and using * * * gas (natural, artificial, or liquefied petroleum).	*State Fire Marshal.
Texas	Article 6053 of the Revised Civil Statutes of Texas of 1925 as amended.	*Liquefied Petroleum Gas Division, Railroad Commission of Texas, Austin, Texas.
Vermont	(1) Act 98, Legislature of 1925 provides that the State Fire Marshal may, with the approval of the Governor, make regulations for the storage, sales, use, transportation, etc., of inflammable fluids. (2) Section 7488 Vermont Statutes, 1947 Revision, as amended by House Bill 202, 1949 Session.	**State Fire Marshal.
Virginia	Chapter 116, Laws 1950 (House Bill No. 169) (LPGA Model Law).	**State Corporation Commission.
Washington	(1) General Powers of Department of Labor and Industries. (2) Chapter 101, Laws 1949 gives Washington State Patrol jurisdiction over transportation with authority to issue regulations, taking into consideration ICC and recommendations of advisory committee.	*Division of Safety, Department of Labor and Industries (Washington State Patrol on Transportation).
West Virginia	Chapter 29, Article 3, Section 4-a gives State Fire Marshal power to issue rules covering the storage, transportation and use of L.P. gas.	*State Fire Marshal.
Wisconsin	Title 13, Chapter 101, Section 101.105, Wisconsin Statutes 1945.	*Industrial Commission.

Digested from LPGA Manual.

Kansas, New Jersey, Pennsylvania have passed specific laws. In others, regulations have been issued under general statutes. It is probable that this subject will be considered by some state legislatures in 1953.

Business's constant companion, taxes, is always a fruitful source of legislation, for the state. There have been many attempts to place specific product taxes on L.P. gas but only two exist on the statute books. A Florida statute authorizes Florida municipalities to place a 10% levy on purchases of L.P. gas and a Mississippi law levies a privilege tax of ⅛ of 1 cent per gallon. The Florida tax is part of a tax law on public utility services. It has been subject to several attacks as to its constitutionality in its application to L.P. gas, but so far, the courts have held it constitutional. The Mississippi tax ties in with the safety regulatory law and raises a point worthy of consideration briefly mentioned before.

Confuse Safety and Revenues

Most safety experts agree that laws aimed at the creation of safe practices should not stray into the field of revenue raising. To do so confuses the issues and merits of a safety law, and distorts the picture for the legislator and the public. There exist in a few states, and there will undoubtedly be introduced from time to time, bills that call for inspection, licensing, permits or fees that are essentially revenue raising schemes.

It is difficult to draw a distinct line on this point. Each such measure must be weighed by itself and if the scales are overbalanced so as to indicate no relationship to safety, no safety factor, in the taxing provision, the proposal should be recognized for what it is—a revenue bill. While we should realize our responsibility of bearing our fair share of legitimate costs of government, we must be alert to protect our industry against discriminatory raids.

Each expansion of use, or new use for L.P. gas brings with it industry problems in many phases, including legislation. As a result of developing motor fuel usage, the motor fuel tax laws are undergoing scrutiny by the tax administrators, with the result that state legislatures will be asked in many instances to rework these laws. Several states have already

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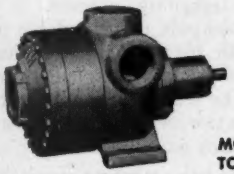
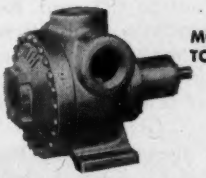


MODEL TC-3

Recommended only for fast loading and unloading service on large transport trucks. Rated transfer capacity 100 GPM at 500 RPM maximum shaft speed. Weight of pump only, 130 lbs. All ports threaded 2½" standard pipe size. Inlet pipe, valves, and fittings should be 3" or larger.



MODEL TC-2

Our most popular delivery truck model. For 500 RPM power takeoff drive and 2½" inlet piping. May be used in a 2" system, but capacity will then be somewhat reduced. When properly installed, will run a 30 GPM meter to maximum capacity against differential pressures as high as 75 p.s.i. Will normally fill any consumer tank as fast as its filler valve will accept fuel. Will fill nearly all large tanks having 1¼" filler valves at the 30 GPM rate without a vapor return connection being made. Tanks with ¾" and smaller filler valves always fill slower, at 20 GPM or less.

MODEL TC1044H

Another popular model. For 2" piping and 900 RPM drive. Suitable for average delivery trucks where the greater part of the service is filling consumers' smaller tanks equipped with ¾" filler valves or less, but where larger tanks are occasionally filled. When properly installed and run at the recommended speed, (900 RPM, usually requiring power takeoff having 1 to 1 gear ratio), will fill small tanks, and tanks with ¾" filler valves and less, just as fast as the larger TC-2 above. Actual delivery to large tanks with 1¼" filler valves rarely exceeds 22 GPM at 75 p.s.i. differential, due to the smaller size of this pump. Light in weight and easier to install than the TC-2.

MODEL TC1044

Designed especially for small delivery trucks, for filling trailer bottles, single 100 lb. cylinders and other small consumer tanks from the truck. Rated transfer capacity 20 GPM at 500 RPM maximum. Weight of pump only, 40 lbs. All ports threaded 1½", standard pipe size. Inlet pipe, valves and fittings can be 1½", but 2" will assure faster delivery.

These pumps may be operated in either direction of rotation, so will load and unload through the same piping, if a reversing power takeoff is provided.

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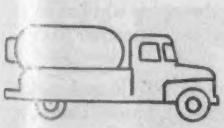

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"The accompanying resume of State Laws pertaining to L. P. gas operations is most timely. Legislatures in many states, when meeting this winter, will consider regulations to control transportation, storage, distribution, and utilization of butane and propane.

"The industry needs and welcomes state regulations. All it asks is that they be fair to the industry and to the public, alike.

"The Liquefied Petroleum Gas Association, which has persistently fought for fair state legislation and has prepared what is termed a model law based upon established safe practices within the industry, covers legislative developments in its regular bulletins to members.

"Art Kreutzer has borne an important part in this program and it is appropriate that he should tell here what has been done and what is pending. Thus, dealers will be informed regarding laws in their own states and product manufacturers may better know requirements they must meet when shipping equipment into various regions."

•

The above editorial note was published exactly five years ago this month for a similar article by Arthur Kreutzer. It is interesting that it applies so aptly to this similar article today, and prompts its use again.—Editor.

done so. Up to recent date, most states handled motor fuel taxation of L.P. gas under a general motor fuel tax law, or "Gasoline Tax," with such special regulations as the tax administrator found necessary. In others a "Fuel Use Tax" imposed the tax and responsibility on the user.

However, as a result of the deliberations of the North American Gasoline Tax Conference on this subject, several states have adopted, and many more will consider, a "Special Fuels Tax Law" which requires licensing of both dealer and/or user and payment of tax on all product placed in the motor fuel tank. Florida, Indiana, Kentucky, Louisiana, Minnesota, Missouri, Pennsylvania, Texas and Utah have already adopted this treatment and other states including Arkansas, Oklahoma, Rhode Island and Wisconsin are expected to consider a similar law in 1953. In this discussion of tax legislation, only taxes specifically dealing with L.P. gas have been considered. There are many general business taxes, some with peculiar significance for the L.P. gas operator, such as use taxes and personal property taxes, that must be always borne in mind.

By far the major source of legislation and regulation has been in the field of safety. The industry has been fortunate, and it is a tribute to the intelligence of the state officials and the hard work of many industry members that there is national conformity in this legislation. Many states have adopted LPGA's model law or a substantial copy for their basic legislation and all states use NFPA Pamphlet No. 58 as a basis for their safety standards. The vast majority of the states have adopted or reproduced this safety standard in its entirety without change.

State Officials Usually Cooperate

In the others there may be minor variations on a few points. Rarely is there an actual conflict, and the industry is ever working, and receiving the cooperation of state officials, in reconciling these. This national uniformity is important if the industry is to enjoy continued growth and prosperity. Chinese walls built of regulation are not conducive to any industry's growth.

The problem of state legislation has become more than a local problem for in this need for uniformity it takes on a national outlook. State legislatures and regulatory bodies have a habit of copying material—good and bad, alike—from other states in their desire to have the latest and cover the field. The basic reasoning may neither be apparent, nor sought.

Again, state officials have their counterpart organizations of national trade associations in national societies. In these societies they also recognize the importance of national uniformity and more and more seek to develop their laws on this basis. They intelligently work with and seek the assistance of trade associations at this national level. Recent examples of this can be seen in LPGA work with the Conference of Weights and Measures officials and the North American Gasoline Tax Conference, mentioned before.

This all adds up to a realization that industry today must be prepared to argue many of its local causes at the national level. A unified industry at both the local and national level is the answer and most fortunately the L.P. gas industry is meeting this challenge.

"Gotta Tell To Sell"

"Chet" Stackpole, sales authority and vice president of the Eureka Williams Corp., Bloomington, Ill., gave listeners at the American Gas Association's Atlantic City convention a sound clue to solve the mystery of where good salesmen hide, and how to keep them once they are found.

Livewire Stackpole told his large audience to "see your local preacher, priest, rabbi and secretaries of Rotary or Kiwanis groups if you have any problem in getting salesmen."

With fiery zest, Stackpole lashed into sales managers. "In the specialty selling business," he said, "the responsibility for success or failure doesn't lie with the salesman, but with the supervisor." He said that specialty salesmen should be told that turn-downs shouldn't discourage them, but should be considered part of the "toughening" process.

Mr. Stackpole presented his audience with his well-tested rules of successful selling and emphasized that "In the selling business you have to be nice to everybody." He gave five selling rules as follows:

1. Hold a sales meeting every morning with all sales personnel before they go out on the road. Rehearse new sales points and disperse more product knowledge at these meetings in order that the salesmen be thoroughly prepared to go out each day.

2. Use demonstrations. Have the finest tools for making demonstrations and don't be afraid to give them at every opportunity. Tell customers where to buy products, how much they cost and all the benefits of the equipment to the customer. "Demonstration is one of the finest old-fashioned ways to get business and one of the most result-getting."

3. Coupons and leads should be followed up immediately after arrival in the office. A coupon or lead is nothing but a free ticket to the home for the salesman, and a salesman should never leave the territory near the "coupon" house until he calls on at least five other homes in the neighborhood.

4. More advertising should be done that will be of effective use at the local level, in order to influence people right where they are going to buy. Television gives the opportunity to sell and tell the story almost as if one were right in the customer's presence.

5. Enter into more public and social activities. Contacts and more contacts count. Night closings are very important.

NEW PACKAGED LP-GAS STATION

999 W.G. Capacity

A completely packaged storage and dispensing station, assembled on a steel skid base for simple, low cost installation. Now, you can increase the use of LP-Gas as motor fuel in buses, trucks, taxis and other motorized equipment by offering convenient servicing with Beaird packaged LP-Gas stations.

NEW TRAILER TRANSPORT

for LP-Gas or Anhydrous Ammonia

5200 W.G. Capacity

Beaird announces the first in a line of transports, a ruggedly built twin-tank trailer which meets all state highway regulations. Its sweeping, modern lines, smooth rear closure, and gleaming white enamel finish make it an outstanding traveling advertisement for dealers.

BEAIRD
SHREVEPORT

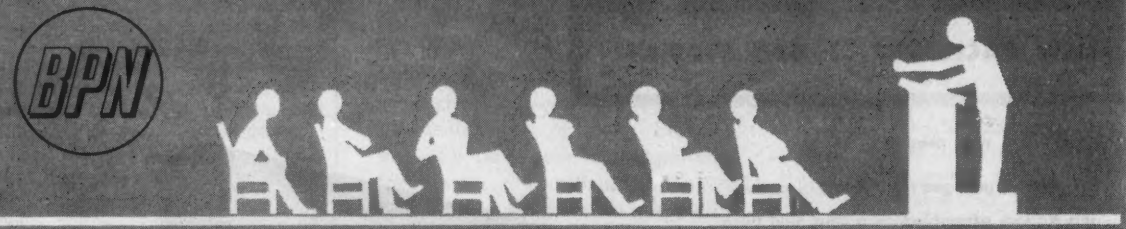
MACHINING • FABRICATING • STEEL WAREHOUSE

These two new products have been designed by Beaird engineers, the men who developed Beaird LP-Gas domestic systems and bulk storage tanks. Behind them is Beaird's thirty-five years' experience in manufacturing pressure storage equipment for the petroleum and chemical industries.

Write for complete information on Beaird packaged LP-Gas stations and trailer transports.

THE J. B. BEAIRD COMPANY, INC.

SHREVEPORT, LOUISIANA



ASSOCIATION NEWS

Kansas

The Kansas LPG Association held its annual fall business meeting Oct. 30 at the Broadview hotel, Wichita.

This one-day meeting featured talks by Walter J. McClanahan, chief deputy state fire marshal, Topeka. His subject concerned the recent regulation for the venting of motor vehicle relief valves. Mr. McClanahan lauded the Kansas operators for their excellent safety record and cooperation with the fire marshal's department

J. Fred True, state sealer, Kansas Board of Agriculture, reported on the recent tests of proving L. P. gas liquid meters by his department.

Harold Null, an investment banker of Wichita, was the featured luncheon speaker. Mr. Null's resume of the economic factors affecting current and future price levels was both thought provoking and revealing regarding the manipulation of money and credit by the nations top economists.

Newly elected officers of the North Dakota LPG Association look over industry promotional material produced by the LP-Gas Information Service. The new officers who took office at the state convention in Minot, Nov. 6-7 are (left to right, seated) : Art Morker, vice president, Williston; Neman Behm, president, Minot; Leonard Stone, director, Bismarck. Standing are Duane Busch, secretary-treasurer, Jamestown, and George Galloway, director, Mutt.

At the Kansas L. P. Gas Association meeting (left to right) : A. J. Burke, Farmers Butane Service, Hutchinson, new director; W. B. Hettic, Hettic Gas Co., Liberal, newly elected president; J. Lee Laptad, Johnson County LP-Gas, Olathe, immediate past president; Francis Jensen, Atwood Supply Co., Atwood, elected vice president; Harold Stanton, Stanton Propane Service, Morrowville, elected secretary-treasurer; R. W. Dougherty, Mid-Continent Butane Equipment Co., Great Bend, new director. A. C. Ferrell, Ferrell Butane Gas Co., Atchison, re-elected director (not pictured).

Harry Thomas, Stanolind Oil Gas Co., Tulsa, Okla., spoke on "How Underground Storage Helps the L. P. Gas Dealer." Mr. Thomas' talk was highlighted by diagrams of the different types of underground storage methods.

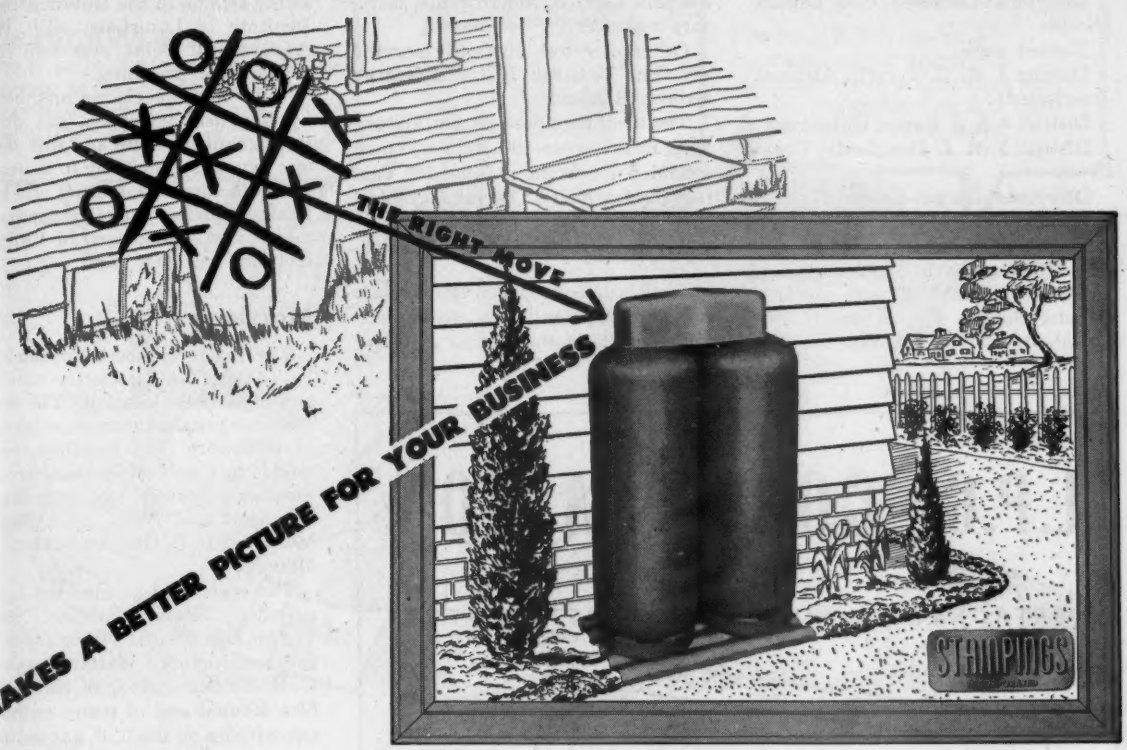
J. Lee Laptad, retiring president of the Kansas association, emphasized the need for continued membership support for the coming legislative sessions.

The election of the board of directors held in the afternoon filled vacancies in three districts and the director-at-large post. Those terms expiring were:

District 1. NE Kansas—A. C. Ferrell, Atchison.

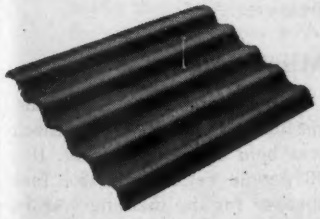
District 4. SE Central Kansas—Frank Groves, Arkansas City.

District 5. NW Cen. Kansas—C. J. Steckel, Russell.



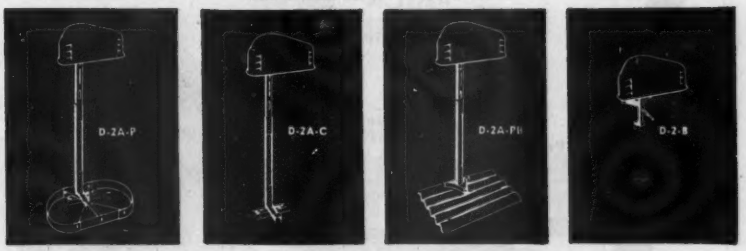
PLEASING APPEARANCE helps greatly to sell LP-Gas Service. That's why we have spent time, effort and money to make Stampings Housings the kind of units that you can install with pride and satisfaction.

You can profit now by supplying your trade with the type of housing that looks good on the job — and provides maximum safety. Select from this complete line the Stampings model that best meets your requirements. Profit with good design to increase your business and satisfy particular customers.



Made of asbestos and concrete, these bases stand up under weather and abuse. Corrugated surface provides drainage and ventilation. Size is 21" wide by 30" long. You drill holes as required.

THE D SERIES IN 4 MODELS



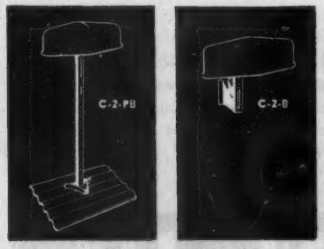
MODEL D-2A-P. A complete unit for 2 cylinders. Comes with hood, post and base form.

MODEL D-2A-C. A complete unit for 2 cylinders. Comes with hood, post, but no base form.

MODEL D-2A-PB. A complete unit for 2 cylinders. Comes with hood, post and prefabricated base.

MODEL D-2-B. Wall bracket type for 2 cylinders. Comes with hood, bracket and screws.

THE C SERIES IN 2 MODELS



MODEL C-2-PB. A 2-cylinder unit with hood, post and prefabricated base.

MODEL C-2-B. A 2-cylinder unit with hood mounted on bracket.

FOR SINGLE CYLINDER

MODEL SH-1. A single cylinder unit for wall mounting. Brass pin hinge and necessary screws.

RIMCO CAST ALUMINUM

MODEL RIMCO E-1-TB. A cast aluminum housing for 2 cylinders. Comes complete with hood, post and prefabricated base.

STAMPINGS INC., DAVENPORT, IOWA, Phone 3-2781

Director-at-Large—J. Lee Laptad, Olathe.

Elected were:

District 1. A. C. Ferrell, Atchison (re-elected).

District 4. A. J. Burke, Hutchinson.

District 5. R. J. Dougherty, Great Bend.

Director-at-Large—Leslie Greer, McPherson.

The board of directors elected William Hettic, Hettic Appliance Co., Liberal, president; Francis Jensen, Atkans Supply Co., Atwood, vice president; Harold Stanton, Stanton Propane Gas Co., Morrowville, secretary-treasurer.

Other directors currently serving are Glen McGuire, Iola, and George Grimes, Ashland.

The meeting closed with a Fellowship Hour. Over 100 Industry men attended, according to Robert C. Tanner, Central States District secretary.

Louisiana

Forty butane-propane retail dealers met at Hotel Bentley in Alexandria, La., Nov. 25 in the annual mid-year safety session of the Butane-Propane Institute of Louisiana, with W. R. Anderson of Delhi, president of the organization presiding.

"The institute claims membership by liquefied petroleum gas dealers throughout the state and this session was devoted principally to increasing safety factors in operating and maintaining liquefied petroleum gas equipment," J. C. Chenevert of Pineville, institute secretary, said.

Maryland

The quarterly meeting of the Maryland L. P. Gas Association was held Oct. 14 at a new location, "The Barn", a famous restaurant three miles south of Baltimore. The meeting was attended by a well represented group of members, dealers, and suppliers. A representation from the Delaware-Maryland L. P. Gas Association also attended.

The meeting was directed by the president, Ross Markline, Super-Therm Gas Co., of White Hall. The speakers included Walter Hogan and C. C. Turner, author of the *Bottled Gas Manual* and of many authoritative articles on the L. P. gas industry, who gave an interesting talk on the gas industry as a whole.

Michigan

The next regular winter meeting of the Michigan Liquified Petroleum Gas Association is to be held at the Pantlind hotel, Grand Rapids, January 19-20.

Entertainment committee: Harry Richards, of Grand Rapids, chairman; Wm. Goetz, of Burt LP Gas, Jackson.

Program committee: J. O. Reavis, of Kalamazoo, chairman; Cal Wright, of Benton Harbor, and Dick Stinger, of Durand.

There are many important issues to be voted on by all concerned, according to J. O. Gower, secretary-treasurer.

Mississippi

The annual fall meeting of the Mississippi L. P. Gas Dealers Association was held at Jackson, Nov. 10, with 78 people registered. The featured speaker for the meeting was Joseph Delfausse, chief engineer of the Neptune Meter Co., New York, who spoke on recommendations for proper tank truck pumping and metering of L. P. gas.

The following officers were elected: Dewey S. Dearman, Hattiesburg, president; Earl Hanna, Jackson, W. E.

L.P.G. CORPORATION

(PETROLANE'S WHOLESALE DISTRIBUTOR)

PETROLANE'S LPG retail outlet at Morgan Hill, known as Paradise Valley Butane Service, has R. H. "Dick" Davis as district manager.

R. H. "DICK" DAVIS

Dick has been with the Paradise Valley Butane Service since 1944, and is an "old-timer" in the Morgan Hill area. He has established himself in Central California among the fruit growers and LP-Gas dealers as a "specialist" in keeping their dehydrating equipment in full operation during the busy season. LP-Gas dealers will find Dick ready and willing at all times to help them with their LP-Gas problems.

PETROLANE, Ltd.

HOME OFFICE: LONG BEACH, CALIF. 1696 E. Hill St. Phone 405478

Bakersfield, Post Office Box 1426 • Phone 49040

Yuba City, Post Office Box 111 • Phone 36561

I'm RUTHLESS RUST. I SELL FOR YOU BY DESTROYING ORDINARY WATER HEATERS, BY CONVINCING HOMEOWNERS THAT PERMAGLAS WATER HEATERS ARE SAFE FROM MY ATTACKS.
I'm Four B. I. I KEEP YOUR CUSTOMERS SOLD BY PROTECTING PERMAGLAS WATER HEATERS FROM RUST AND CORROSION WITH A. O. SMITH'S FOUR BASIC IMPROVEMENTS.*
Ruthless Rust
Four B.I.

Your two Best Salesmen—

They're different characters...

but both of them Sell A.O. Smith Permaglas® AUTOMATIC WATER HEATERS

More than ever, it will pay you to sell A. O. Smith *Permaglas* automatic water heaters.

Tell the big story about *Permaglas*. It's easy to show the advantage of owning the *one* water heater that can't rust because *glass can't rust* . . . the *only* water heater with Four B. I. Protection against all rust and corrosion.

National Advertising reaching more than 40,000,000 homeowners is paving the way. "Ruthless Rust" and *Four B. I.* have been pre-selling *Permaglas* water heaters in your own community!

And A. O. Smith merchandising and dealer helps are ready to go, to make *Permaglas* pay off for you.

MERCHANDISING HELP GALORE!

A.O.Smith

PERMAGLAS-HEATING PRODUCTS

SALES: Atlanta • Chicago 4 • Dallas 2 • Denver 2 • Detroit 21 Houston 2 • Los Angeles 22 • Midland 5, Texas • Milwaukee 8 Minneapolis • New York 17 • Philadelphia 3 • Pittsburgh 19 San Francisco 4 • Seattle 1 • Springfield, Mass. • Tulsa 3 Washington 6, D. C.
SERVICE: Chicago 17 • Dallas 1 • Los Angeles 12 • Union, N. J. International Division: Milwaukee 1
Licensee in Canada: John Inglis Co., Ltd.

Mail the coupon for complete information

A. O. Smith Corporation
Permaglas-Heating Division, Dept. BP-153
Kankakee, Illinois

*Send me complete information on the Four Basic Improvements of A. O. Smith *Permaglas* Automatic Water Heaters. Show me your merchandising plan which helps dealers capitalize on *Permaglas* nation-wide consumer acceptance.

Name_____

Firm_____

Address_____

City_____ Zone____ State_____

Lee
PROPANE & BUTANE CYLINDERS
(ICC4BA240 SPECIFICATIONS)
100 LB. PROPANE CAPACITY
Designed for SAFE and ECONOMICAL SERVICE
20 LB. PROPANE CAPACITY
STEEL COOPERAGE DIVISION
THE SERRICK CORPORATION
4801 Bellevue
Detroit 7, Michigan

Officers and directors of the Mississippi association, seated (left to right): H. H. Whitworth, Oxford, vice president; Dewey S. Dearman, Hattiesburg, president. Standing (left to right): W. E. Hope, McComb, vice president; W. U. Moss, Jr., Gulfport, director; John S. Fair, Louisville, director; Clant M. Seay, Jackson, executive secretary; and Earl Hanna, Jackson, vice president. Fred Gunter, Kosciusko, not pictured, was elected secretary-treasurer.

Hope, McComb, and H. H. Whitworth, Oxford, vice presidents; Clant M. Seay, Jackson, executive secretary; Fred Gunter, Kosciusko, secretary-treasurer; and John S. Fair Louisville, and W. U. Moss, Jr., Gulfport, directors.

The outgoing president and vice president, respectively, are Lewis Graeber, Marks, and John Grice, Picayune.

Oklahoma

The Oklahoma LPG Association held its annual fall business meeting, Nov. 17 at the Skirvin hotel in Oklahoma City.

This one-day meeting featured

R. L. Epple

talks by Wm. J. Marshall, fire marshal of Oklahoma, who spoke on the "Enforcement of the Products Liability Insurance Law of 1947."

Kenneth Martin, Kenneth Martin Insurance Agency, Enid, was the luncheon speaker. His excellent discussion of L. P. gas insurance left his audience a serious thought on adequate coverage for their business.

Senator Raymond Gary, Sooner Oil Co., Madill, discussed the 1953 legislative program of the Oklahoma association and emphasized the need for local work among dealers and legislators to get understanding and cooperation.

Elected by the board of directors as 1952-53 officers were:

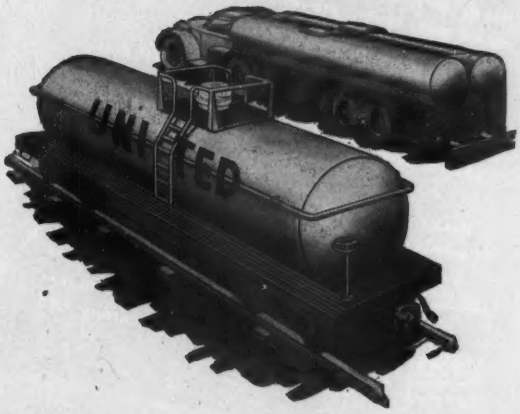
President—R. L. Epple, Epple Butane Gas Service, Tecumseh. Vice president—J. D. Howard, Howard Butane Co., Elk City. Secretary-treasurer—Glenn Springer, Farmers Cooperative Gas Association, Enid.

The meeting closed with a Fellowship Hour. Over 100 industry men attended according to R. C. Tanner, Central States secretary.

Oklahoma

The Butane-Propane Dealers Association of Oklahoma has been organized with the following officers: Byron L. Bristow, Home Modern Gas Co., Oklahoma City, president; M. C. Clanton, Clanton Propane and Butane Gas Co., Oklahoma City, vice president; L. G. Saeger, Oklahoma City, secretary-treasurer.

5 Good Reasons
why a fuel contract with UNITED is good business



1. **Dependable delivery in our own tank-car fleet.**
2. **Top Quality gas — rigid specifications.**
3. **Double-checked for proper odor.**
4. **"Automatic Supply" service.**
5. **Eleven producing points in three states.**

Exceptional fuel supply service is just one of the **TEN ways it pays you** to do business with United. Get the full story from your United service representative.

UNITED PETROLEUM GAS CO.

806 ANDRUS BUILDING • MINNEAPOLIS, MINN.

SALES REPRESENTATIVES IN:

CLINTON, MISSISSIPPI • ST. LOUIS, MISSOURI • DAYTON, OHIO

DAVENPORT, IOWA • HOUSTON, TEXAS

Dealers: Use these 5 GREAT SELLING FEATURES to boost your business on...

Heavy-duty, full-width, radiants, scientifically designed to deliver maximum of healthful, radiant heat.
Heavy cast iron burner of famous Humphrey raised port design, pre-tested for perfect operation.
Exclusive Humphrey-designed, stainless steel, dust-free pilot — most dependable, trouble-free pilot offered today.
Heavy welded cabinet with steel reinforcing members welded in — extra strong, rigid, long lasting.
Rich, lustrous, two-tone Opalescent Brown finish, infra-red baked to extreme hardness. Resists marring and discoloration.

Choice of vented and unvented models in range of sizes, for natural, manufactured, and LP gases.

Humphrey RADIANTFIRE CIRCULATORS

The five important selling features listed above are a reminder of the superb quality built into those Humphrey Radiantfire Circulators that you have on your sales floor. Point out these features to your customers. Show them the brilliant styling and superior construction of these Humphrey Heaters. Explain how this extra Humphrey quality assures them extra years of better heating and lower fuel costs. Year after year, these nationally advertised Humphrey Radiantfire Circulators are among the top-selling appliances in many dealers' stores. You, too, will find that it pays to give them prominent display space, and extra sales attention.

GENERAL GAS LIGHT COMPANY

KALAMAZOO, MICHIGAN

23 Warren Street, New York City — 2nd Unit Santa Fe Building, Dallas — 225 Eleventh Street, San Francisco

The new organization is on a temporary basis with only retail dealers in liquefied petroleum gas as members. A permanent organization may be formed later. The new association is not affiliated with any national or other state L. P. gas organization and is not modeled after any other state dealers' association, according to Mr. Clanton.

Pennsylvania

The three western regions of the Pennsylvania L. P. Gas Dealers Association met at the Hotel Schenley, Pittsburgh, Nov. 24. This was the first of a series of meetings to be held in the various sections of the state by the board of directors of the association.

The president of the state organization, A. C. Horner, of Harrisburg, presided at the meeting. A. E. Bone of Malvern and vice president of the association, spoke on the advertising program being carried out in the eastern part of the state in cooperation with the utility gas companies and the gas appliance manufacturers.

Charles Yost, general sales manager of the Peoples Natural Gas Co. of Pittsburgh, and Wm. Geisinger of the advertising staff of the Tri-State Gas Companies Association attended the meeting as guests of the association. Mr. Yost spoke briefly on the plans of the natural gas companies in Western Pennsylvania and pledged his whole-hearted cooperation with the L. P. gas dealers of western Pennsylvania.

W. D. Cook, of Whippany, N. J. and chairman of the state legislative committee, spoke to the group on the legislative problems facing the L. P. gas dealers in the state. Mr. Cook informed the dealers that there was definitely going to be regulatory legislation passed at the next session of the legislature which meets in January. His committee was working closely with the proper authorities and was doing everything possible to have the new law one that the L. P. gas dealers of the state could live with.

Wm. H. Plank, of Hollidaysburg, and chairman of the state and national membership committee, challenged every dealer present to join the associations and lend their moral and financial support.

At the board of directors meeting which was held in the afternoon it was decided to hold the next board meeting and a district dealers' meeting at Wilkes Barre, Jan. 5.

Ship LPG Pumps To "Farthest South"

By O. D. Hall

FORMER records for long distance shipments of L. P. gas equipment were recently broken by Corken's, Inc., of Oklahoma City, Okla., when vapor, transfer and bottle pumps were consigned to the Chilean government for delivery at Tierra del Fuego, Chile, near the southern tip of South America.

P. E. Gray

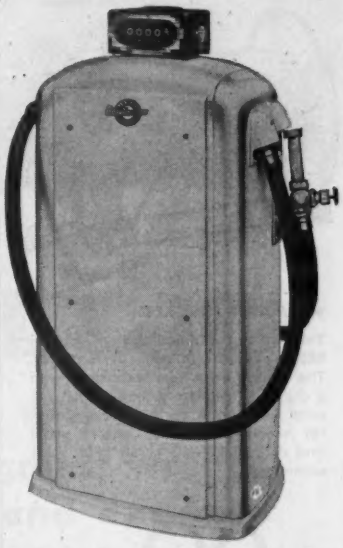
The pumps, designed and manufactured by this firm were routed through the port of Houston, Texas, for their long trip of more than 7000 miles by land and sea for installation and use in Chile during 1952, according to Charles Corken, head of the liquefied petroleum gas department of Corken's.

Equipment Specially Designed

The order went out some time after Corken's South American representative had spent some time last year arranging for the designing and manufacture of the special equipment required to meet the needs of the government project.

Since 1948 Corken's, designers and manufacturers of L. P. gas and ammonia pumps, also has been serving

NEW PROFITS
FOR BUTANE DEALERS WITH THE NEW
TEXOIL
Butane-Propane
DISPENSER



Is Butane business passing your door every day? Increasing use of LPG as motor truck fuel has opened a NEW avenue for profits for Butane dealers. TEXOIL Butane — Propane Dispensing Equipment will help you cash in on this new market. Many of the trucks that pass your place of business use LPG. Be ready for them!

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

Sure, it costs money to get in this new LPG business but when you decide to install your equipment, be sure it is the BEST and the SAFEST! Only by having the finest dispensing equipment will you be certain that the installation will be completely satisfactory. Only safe, satisfactory equipment will be profitable to you. Your investment begins to work for you immediately.

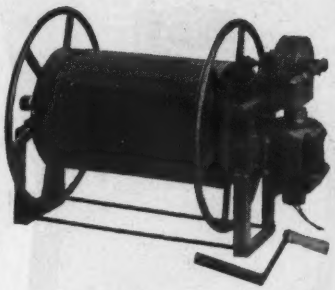
Write today for information without obligation.

TEXOIL EQUIPMENT
INCORPORATED
Formerly The ALAN W. BOWSER COMPANY
1816 COCKRELL STREET
DALLAS 2, TEXAS
Telephone HUnter 2868

ACE

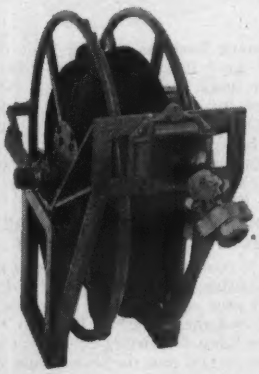
HOSE REEL

for Butane or Propane



• **ELECTRIC HOSE REEL**

The quality that's built into ACE HOSE REELS pays off in peak performance. The Electric Hose Reel is designed with a clutch . . . a safety feature that assures longer life for hose and motor. For handling long hose lengths you'll find ACE ELECTRIC HOSE REEL most economical.

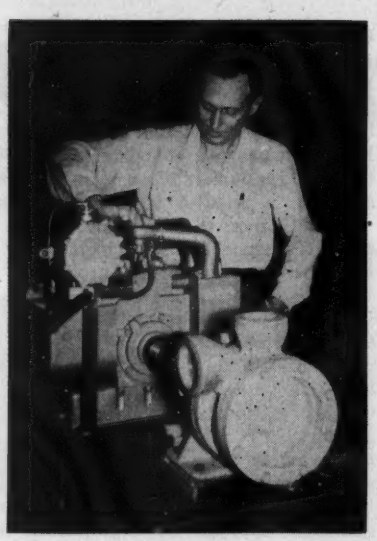


• **SPRING HOSE REEL**

ACE HOSE REELS save time, save money. Engineered to handle up to 50' of 1" material the ACE SPRING OPERATED HOSE REEL assures satisfactory performance. All pipe fittings are heavy duty steel and a chiksan ball bearing swing joint is a component part of reel.

ACE HOSE REEL CO.

5466 Alhambra Ave.
Los Angeles 32, California



Charles Corken standing beside engine-driven transfer pump similar to ones shipped to South America, except this one is equipped with LPG carburetion.

the Argentine government's LPG program, as well as supplying similar equipment to Old Mexico.

"What we like about business from Argentina, Mexico and Chile, is that the U. S. taxpayer profits from this business rather than financing it," said Mr. Corken.

For several years the Corken firm has also been shipping material to France, Italy and Belgium, most of it under the Marshall Plan. By late 1950 it had sold about $18,000 worth of vapor and liquid pumping equipment to these countries. These pumps were powered by motors built to the particular electrical specifications of the various countries to which they were consigned. They ranged in horsepower from 1½ through 3 and 5 hp. and the pumps included single and twin-cylinder, vapor, and high capacity transfer and two sizes of cylinder filling pumps.

A Long Way Down

"When we sent L. P. gas pumps to Italy we thought that we were getting far enough away from home but when we packed 12 export crates and sent them from Oklahoma City, along the full length of Mexico, Central and South America almost to Cape Horn we realized that we were breaking our own long-distance delivery records," Mr. Corken commented.

Founded more than 30 years ago by O. K. Corken, the firm confined its operations at first mostly to selling and distributing refinery and gasoline pumps and related materials. In 1924, the elder Mr. Corken took his son Charles into the business and when the liquefied petroleum gas industry loomed on the horizon, the firm added L. P. gas pumps and equipment to its line, with Charles in charge of that department. The business grew until a demand for assistance in planning and installing equipment arose from the field and a plant for designing and manufacturing LPG pumps and bulk systems was met. An engineering and sales force was also organized.

Sales Force Expanded

Expanded sales to foreign countries has resulted in enlargement of the sales force and R. E. Gray recently was appointed as assistant sales manager. He came to Corken's in May, 1950, for combination duties in the engineering and sales departments. After graduating in 1947 from the National L-P Gas Institute at Tulsa, he went to the Anco Manufacturing & Supply Co. of Tulsa, working in the engineering department on the design and installation of retail bulk plants. He later was connected with Anchor Petroleum Co. in the operating and engineering departments.

Field services include bulk plant installation, trouble shooting on L. P. gas equipment and proposed expansion of dealer operations. He also assists in developing advertising sales and instructional literature covering gas and anhydrous ammonia equipment.

N. E. LPGA Directors Make New Appointments

The directors of L. P. Gas Association of New England met on Nov. 18 in Boston. George Hammond of Rural Gas Service, Westfield, Mass., was selected as treasurer and director to take the place of Larry Holman, who resigned because of leaving the industry. Walter Scott, C. H. Ackerman Co., was appointed chairman of the Membership and Promotional Committee to further the interests of the association along these lines.

The L. P. Gas Association of New England organized about three years ago and is an integral part of the national LPGA association.

Servel Shows First Trayless Refrigerator At Chicago

The first public demonstration of a household refrigerator that freezes ice cubes without trays, stores them in a basket, and replaces them as they are used was a feature of the annual appliance distributors' conference of Servel, Inc., in Chicago Dec. 11-13.

W. Paul Jones, president of the

The most modern features in refrigeration are shown in this view of Servel's 1953 line. The outstanding development is the ice-making device (upper left) which freezes ice cubes without trays, stores them in the basket and replenishes the supply as needed. A full basket of "ice circles" can be seen there.

company, said that this revolutionary refrigerator would be part of the company's presentation of "the most complete line of products in the refrigeration industry." Other new products in the line are two high-style window type air conditioners and five models of home freezers, including both chest and upright types.

The new ice-maker will be available in electric compression refrigerators, which will be offered for the first time next year as well as gas and electric absorption models.

This is the second move in four months by Servel to "jolt the refrigeration industry out of the danger of a saturated market." The first was the electric "Wonderbar," a portable refrigerette that can be used in any room of the house because it looks like fine furniture.

Carl Brehmer Passes Away

The many friends of Carl Brehmer, Brehmer's Bottled Gas, Rutland, Vt., will be distressed to learn of his death which occurred very suddenly on Oct. 17, 1952.

If this Housing ever Breaks or Distorts we will replace it Free
HEAVY DUTY
RIDGID
"RIDGID" means most service for your money!

Only Genuine

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Look for the wrench with that guarantee label to make sure you get the extra-easy work and extra durability that have made RIDGID the world's most popular wrench.

Only RIDGID assures you a hookjaw that always rides freely in the housing; adjusting nut always spins easily to pipe size. Replaceable alloy jaws won't slip or lock on pipe. Handy pipe scale on hookjaw. Safe stout comfort-grip I-beam handle.

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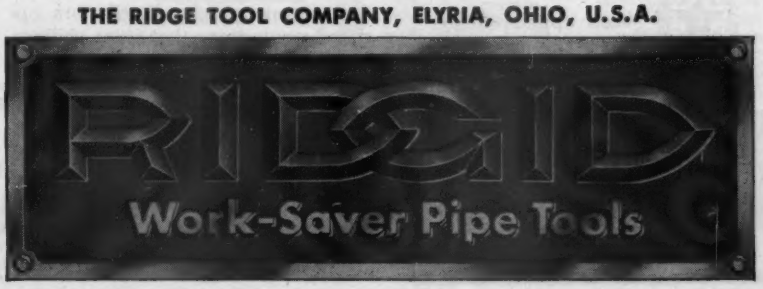

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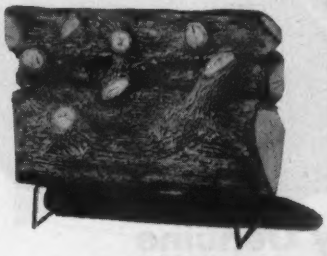

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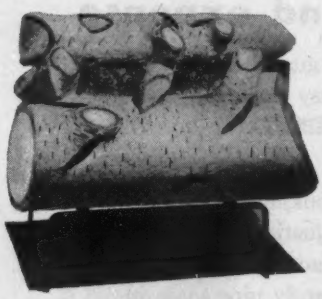

OUR NEW BIRCH LOG

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CALENDAR

All associations are invited to send in dates of their forthcoming meetings for this calendar.

1953

JANUARY

Jan. 18-19—Arkansas Butane Dealers Assn. Mid-year meeting, Little Rock.

Jan. 19-20—Michigan LPGA. Winter meeting. Pantlind hotel, Grand Rapids.

Jan. 23-24 — LPG Tank Fabrication Association. St. Charles hotel, New Orleans.

Jan. 26-27—Compressed Gas Association, Inc. 40th annual meeting. Waldorf-Astoria, New York City

Jan. 28—Texas Butane Dealers Assn. Mid-Winter meeting. Baker hotel, Mineral Wells.

FEBRUARY

Feb. 2—New York LPGA winter meeting. Hotel Syracuse, Syracuse.

Feb. 23-24—Indiana LPGA Convention and Trade Show.

Feb. 23-24—New Jersey LPGA, Ritz-Carleton hotel, Atlantic City

MARCH

March 23-25 — Southeastern District Convention. Biltmore hotel, Atlanta, Ga.

APRIL

April 13-14—Assn. of Nebraska LPG Dealers. Annual Convention. Fontenelle hotel, Omaha.

April 15-17—Midwest L. P. gas service School. Iowa State College, Ames, Iowa.

April 16-18—Florida L. P. Gas Assn. Annual meeting. Palm Beach.

April 19-21—Mississippi L. P. Gas Dealers Assn. Annual convention. Edgewater Gulf hotel, Edgewater Park, Miss.

April 20-30-May 1 — NGAA Annual Convention. Rice hotel, Houston, Texas.

MAY

May 3-6—National LPGA convention and trade show. Conrad Hilton hotel, Chicago.

May 20-22—Gas Appliance Manufacturers Assn. Annual Meeting. The Greenbriar, White Sulphur Springs, W. Va.

JUNE

June 8-9 — South Dakota Liquefied Petroleum Gas Assn. Alexander Johnson hotel, Rapid City.

June 16-18—Missouri L. P. Gas Assn. Annual convention and trade show. New Jefferson hotel, St. Louis, Mo.

June 24-26 — Texas Butane Dealers Assn. Annual convention and trade show. Baker and Adolphus hotels, Dallas.

SEPTEMBER

Sept. 9-12—5th Eastern Gas Service School. University of Bridgeport, Bridgeport, Conn.

Distributors, Producers Disagree on LPG Prices

An early December report from Washington, D. C., stated that liquefied petroleum gas distributors opposed suggestions that price ceilings be raised ½¢ a gallon on LPG products sold from underground storage points remote from producer plants.

In doing so, they split with LPG producer representatives at a Dec. 2 initial meeting of the Office of Price Stabilization's Liquefied Petroleum Gas Industry Advisory Committee.

Discussed at the meeting were several producer requests that OPS add ½¢ to the existing 2¢ a gallon differential for LPG sold from underground storage located adjacent to producer plants.

Producer members of the committee said the extra ½¢ is needed to cover higher distribution costs for LPG moved from underground storage which is far removed from such plants. But the marketers, who would be charged the extra ½¢, said it is not needed, according to OPS.

Only 10 of the 18 committee members attended the meeting and no plans were made for further meetings. No decision came out of this session.

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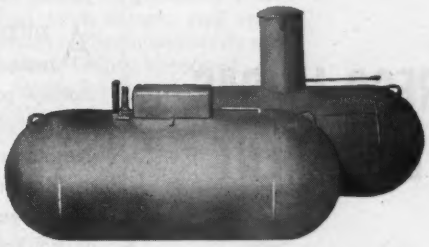

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127 ELLIS ST. N. E. ATLANTA, GA.

Large Underground Storage In the LPG Industry

Will Mean Fewer Shortages, Increased Consumer Confidence and Better Economies

By H. R. Thomas
LPG Sales Superintendent, Stanolind Oil and Gas Co.
Tulsa, Oklahoma

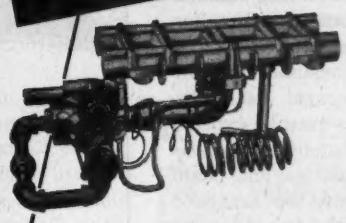
A BRIEF review of the L. P. gas industry's supply, demand and storage problems is appropriate in considering how underground storage fits into the picture for the L. P. gas dealer-distributor. The industry has grown rapidly for many years; particularly since the end of World War II. Compare the 1.7 billion gallons marketed in 1946 (excluding LPG used in motor gasoline and aviation fuel manufacture) with the 4.25 billion gallons marketed last year. This is an increase of approximately 250%. Few major industries can boast of such phenomenal growth.

An industry expanding at such a pace has growing pains. The characteristics of butane and propane make them easily adaptable for clean, uniform heating. These characteristics along with aggressive dealer and distributor sales programs have assisted in making L. P. gas popular and more widely known each year. It now serves nearly all areas not served by pipe line natural or manufactured gas.

Since numerous heating uses are confined principally to cold winter periods, seasonal fluctuations in use cause high demands in cold weather and low demands during warm seasons. Ordinarily the plants extracting butane and propane from natural gas and crude oil streams produce approximately the same volumes each day throughout the year. Thus, it is necessary to inject, flare or otherwise dispose of some production in the summertime to have sufficient volumes available from current production to supply peak winter demands. The consumer with two to one, or three to one, or six to one demand

UNDERGROUND SALT BEDS AND DOMES

TOP PERFORMANCE



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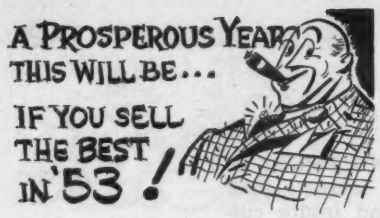

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ratios, winter to summer, creates a supply problem for himself, his dealer or distributor, the marketer and producer.

The ideal consumer is one using the same volume of gas each day throughout the year. These consumers are few. However, there are many attractive uses for L. P. gas involving seasonal fluctuations in demand. The burden of leveling out the supply-demand curve and conserving summer production for winter consumption rests on every segment of the industry. The ultimate consumer must install adequate storage, dealer-distributor bulk plants must be expanded as volumes handled increase. Transportation facilities and plant storage capacity must be expanded as production and demand rise. There must be adequate storage at consumer, dealer-distributor, and marketer-producer levels; development of summer uses and further development of even year-around consumption.

Underground storage is an important link in solving supply-demand problems, but it is not the entire answer. Increased consumer and bulk plant storage are the final answers.

Types of Underground Storage

There are three types of underground storage for LPG:

1. Salt cavities formed in salt beds or salt domes;

2. Mined cavities, usually dug in hard limestones or shales; and,

3. Permeable limestone or sandstone—usually depleted oil or gas formations.

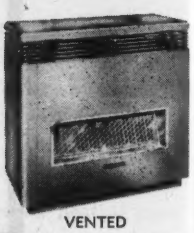
The third type of underground storage is limited to a slow rate of recovery. The proportion of product recovered is generally low, and it does not provide the flexible operation required when large volumes are stored in the summer and recovered quickly in the peak consuming season.

The salt and mined cavities have received the major portion of attention in recent years and will be discussed in this paper.

Salt Cavities

The general areas in which salt formations are known to exist are shown on the accompanying map of the United States. Two areas in the Great Lakes region are underlain with salt. The first extends from

Thermolaire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western New York through western Pennsylvania and into eastern Ohio, and includes northern West Virginia. The second covers all except the southernmost part of Michigan. Another area of salt beds extends from southwestern Texas up through a part of northwestern Oklahoma into much of western and central Kansas, nearly to the Kansas-Nebraska line.

Salt domes are located principally in the Texas-Louisiana-Mississippi Gulf Coast areas, with some domes in east Texas, northern Louisana and central Mississippi.

Although the areas in which salt formations are found are extensive, they represent only a small portion of the entire United States. In some cases salt formations are not suitable because of being excessively deep, limited in thickness, or containing large volumes of stringers of hard anhydrites or other impurities. Water supply and brine disposal problems further limit some areas. Where suitable salt formations are not available, some areas are satisfactory for mined cavities which will be discussed later.

The methods and equipment used to form cavities in salt beds and salt domes are the same in general.

How Cavities Are Formed

In order to form a cavity, a well is drilled into salt and casing is cemented in a hard formation overlying the salt. Cavities may be formed in salt from a few hundred feet below the surface to several thousand, depending on local conditions. Two or three-inch tubing is lowered into the hole through the casing. Fresh water is circulated through the tubing, and as it dissolves out the salt forming a salt brine, it is pumped out through the annular space between the tubing and casing. Salt brine is stored in surface pits or salt water disposal wells. Circulation of fresh water and brine continues until the desired size cavity has been attained. Cavities range in capacity from around 25,000 to over 100,000 barrels.

When storing L. P. gas, the salt water in the cavity is displaced by pumping the product in through the annular space; the salt water coming out through the tubing. When the stored product is needed for shipment the procedure is reversed and salt water is pumped into the cavity through the tubing, the product being forced out through the annular space and piped to loading points for tank car or truck movement or into a pipeline. Recoveries of between 90% and 99% of the stored product are reported.

Salt cavities vary in cost depending on location, depth to salt, difficulties encountered in drilling and washing out operations, and size of cavity formed. A cavity located in an area where fresh water is plentiful should cost less than one located in an area where fresh water is scarce and costly, everything else being equal. The larger the cavity, the lower the average cost per barrel capacity, since the drilling cost and much of the basic equipment would be the same regardless of the ultimate capacity. Thin salt beds which restrict the size of a cavity result in a higher cost per barrel capacity than thick beds where the cavity can be washed out to a large size. Cavities range in cost from approximately $2 to $10 per barrel capacity.

Nearly all of the salt cavities in use or being formed currently are located

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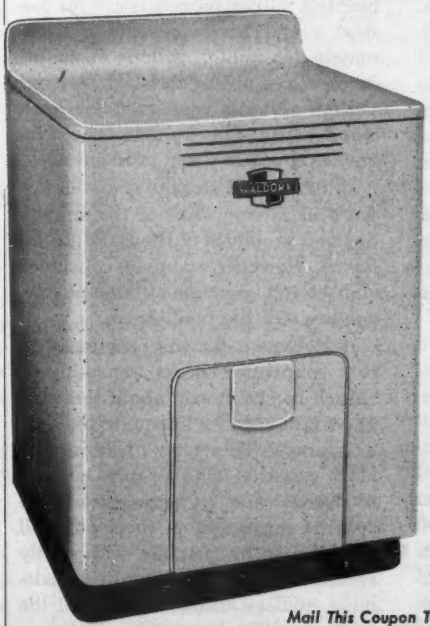

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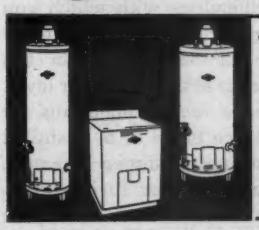

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in the producing areas of Texas, Oklahoma, Kansas, Louisiana, Mississippi, and New Mexico. These cavities are generally adjacent to a plant producing LPG. Transportation must be provided to move stored material during the peak consuming season to market. These cavities help solve some local problems of supply, but add to the transportation problem during the winter for movement to more distant markets. Cavities located in market areas assist in solving peak season supply problems. Product stored during slack demand periods can be made available for short-haul movement to market at times of peak demand. Transportation equipment which would otherwise be idle is utilized for moving L. P. gas to such cavities during the slack periods.

Mined Cavities

Cavities mined in hard rock formations such as limestone and tight shales are being given more attention at the present time than in the past. The number of these projects is limited, but it is believed more mined cavities will be utilized as suitable locations are developed and methods are perfected for sealing the cavities.

Mined cavities are formed by utilizing mine digging methods and equipment in general use. A shaft is sunk to the desired depth. The generally accepted standard as outlined in the Natural Gasoline Association of America Tentative Standards for the Underground Storage of Liquefied Petroleum Gas is one foot of overburden for each psig design and operating pressure. The vapor pressure of the L. P. gas to be stored shall not exceed the maximum design and operating pressure under the NGAA tentative standard. The vapor pressure shall be determined at the maximum cavern temperature (approximately 60° - 65° F.). Thus, a mined cavity with 200 feet of overburden could be used for product up to 200 psig at the determined maximum cavern temperature. The geological character of the overburden and local conditions may further limit the permissible operating pressure.

The shaft is sealed off after the proper inlet and outlet lines, gauges and other pertinent equipment are installed in the shaft along with a wide diameter casing for use as a manhole passage. This makes it possible to enter the cavity from time to time for inspection and servicing without removing the concrete seal.

Product is pumped into and out of mined cavities in a manner similar to that used for surface storage tanks, rather than using the salt water displacement method generally employed with salt cavities. Mined cavities vary in cost from around $4 to $10 per barrel capacity. The problems encountered in the mining operation as well as the size of the cavity have a direct bearing on the cost. After a shaft is sunk and the basic equipment provided, a large cavity can be mined at a lower cost per barrel capacity than a small size cavity.

Underground Cavities' Place in the Industry

A recent survey of underground storage projects by *The Oil and Gas Journal* reported a total of 67 projects underway. Fifty-five of these are washed out of salt beds or salt domes, six are mined cavities, and six are underground storage projects in permeable sandstone or limestone formations. The underground capacity in use at the time of the survey was approximately 1.2 million barrels with ultimate capacities totalling nearly 4 million barrels ready for use next year. This represents approximately 168 million gallons of material produced during the slack demand period which is conserved for peak demand use. This volume is equivalent to about 15 days' production.

Underground storage is a step forward in solving some of the supply-demand problems of the L. P. gas industry. However, adequate consumer storage and adequate bulk plant storage are still the final answer.

A statement I made previously in this connection bears repeating — "Much has been said about the very important need for adequate consumer storage. This type of storage is most essential—the proper amount of storage capacity must exist at the point of consumption, or we shall all continue to be plagued with costly special deliveries, dissatisfied customers, endless headaches, and all the inherent difficulties with which you are all familiar. The National Committee for LP-Gas Promotion has studied storage at the consumer level, and has made recommendations for sizes of storage tanks to be installed for the various consumer demands. One-half of consumer fuel requirements stored in advance for house heating is recommended by the committee.

"This recommendation, as well as others made by the committee, if followed, will help tremendously in providing the proper storage capacity at the consumer level. If you are not thoroughly familiar with the 'LP-Gas Storage and Ratio Manual' prepared by the National Committee for LP-Gas Promotion, I would heartily recommend that you secure this manual and give it serious study right away."

The L. P. gas industry has a bright future for increased sales as supply-demand problems are solved. Adequate consumer and bulk plant storage along with underground storage terminals in the marketing and producing areas will solve these problems. Extreme seasonal fluctuations in use can be easily handled; volumes can be expanded on a sound basis; L. P. gas will be in a better position to compete with other fuels; dealer financing will be on a sounder basis; and consumer confidence in service and supply will be maintained as the supply-demand problems are solved.

George Isaacson Passes Away From Heart Attack

George Isaacson, owner of the Isaacson Bottle Gas Co., Park Rapids, Minn., passed away Sept. 24, following a heart attack. Mr. Isaacson had been connected with the L. P. gas industry since 1938 and had been operating his own plant since 1948.

The Isaacson Bottle Gas Co. will continue in business under the management of Marion Reinert.

"Tell him dinner will always be late until you switch to gas!"

Products and Trade Publications

To secure further information on products or new publications, fill out the coupon and mail, indicating by number the items desired.

1. Restaurant Range

The "Gourmet" gas range, manufactured by Magic Chef, Inc., is designed for use in dietetic kitchens, Sister's homes, tea rooms, small restaurants, large residences, and other kitchens which demand versatile and heavy menu requirements.

This new Magic Chef line features stainless steel construction; six top burners, three extra large; radiant

broiler; chrome polished griddle; two extra large porcelain lined ovens equipped with automatic oven lighting and safety pilots; fluorescent light; and two four-hour electric timers.

Magic Chef, Inc.

1-A. Clothes Dryer

This Caloric automatic gas clothes dryer features the company's "Lo-Heet . . . Hi Breeze" drying principle which is said to use a low degree of heat and a high volume of air. The advantages claimed for this method are that it cuts drying time, reduces fuel costs, guards against shrinkage and greatly reduces wrinkling.

A tapered screen filters out all the lint into the lint trap, which is located in the front of the dryer in a convenient waist-high position. Accessibility

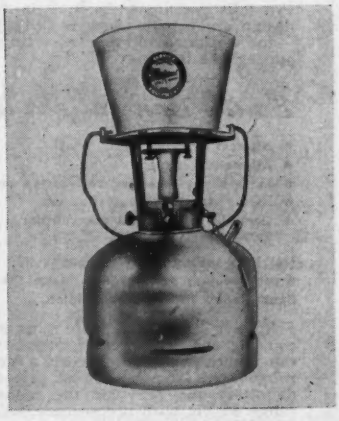
to working parts is accomplished by removing the housing at the rear of the top or by removing the entire front panel. A small door in the front panel provides access to the air shutter and burner. Thus, the dryer, finished in baked enamel on "Bronderized" steel, may be installed permanently in a flush-to-wall position. The drying cylinder is supported front and rear to reduce vibration and wear and to provide quiet operation.

The loading door, which opens down to provide a convenient loading and unloading shelf, is counterbalanced for easy operation and equipped with a master switch that shuts off the motor and burner when the door is opened. Damp-dry clothes may be removed for ironing at any time during the drying cycle. The drying process will resume when the door is closed.

Caloric Stove Corp.

2. Plumbers Furnace

No troublesome pumping, priming or adjusting is required with this furnace; you merely fill the cylinder



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with butane or propane gas and light the burner. Within 12 minutes it will melt an 8-in. pot of lead.

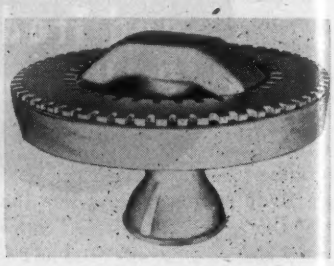
The Mutual No. 2 furnace is compact, lightweight and easily transported; it is always ready for instant use in shop or field; and it is not likely to get out of order since it contains only one moving part.

Some of the features include nonwarping head, adjustable orifice and tube, removable handle and shield. The shield will hold either a 6- or 8-in. lead pot. The furnace develops approximately a 2350° temperature.

This furnace is made to accommodate Mutual's specially designed No. 11 or No. 21 cylinder. These cylinders are built to ICC 4B 240 code and will stand 250 w.p. Both cylinders are fitted with filter valves, 375 lb. pressure vapor relief valves, fillers and liquid level gauges. Capacity of No. 11 cylinder is 12 lbs. propane and that of No. 21 is 20 lbs.

This plumbers furnace is also available in a bench model, Model No. 2A, which has an extra heavy base to prevent tipping over. This furnace is equipped with standard 10 ft. hose which is easily attached to filler connections.

Mutual Liquid Gas Equipment Co., Inc.

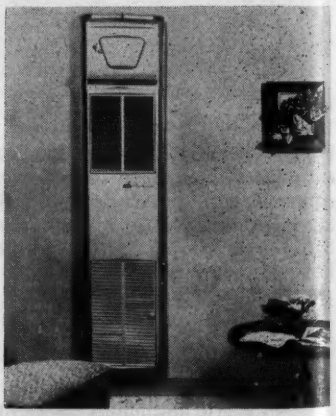


3. Heavy Duty Burner

Adaptable to both new installations and replacements, this new line of heavy duty gas burners, available in 8000 to 30,000 sizes, is designed for commercial, restaurant and a variety of industrial uses. Fast heating for any size urn and adequate heat for the largest commercial capacities is delivered by the burner, yet it is only 4 in. high from air mixing chamber to flame ports.

The "saddle design" drophead provides extra flame height below the appliance in which to develop maximum heat output from the gas consumed. When wide open it provides 30,000 Btu, but can be turned down to minimum flame without danger of backfire.

Chicago Combustion Co.



4. Wall Heater

A new line of gas-fired wall heaters, which permits the installer the choice of up to 24 different combinations to solve a maximum variety of heating problems, has been announced by the Coleman Co. There are six basic models, four of them single-wall and two dual-wall, with input ratings of 25,000 to 55,000 Btu's. Opportunities

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THE WORLD'S BEST RANGE BUY!
The minute you see a South Bend Range you spot it for a Quality Product. Your eye tells you instantly that its modern design and construction is unsurpassed — the workmanship precise — finish and appearance the finest.
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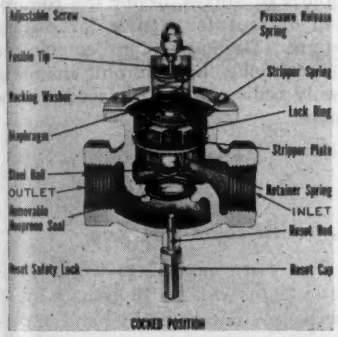
South Bend, Indiana, U. S. A.

for application are almost unlimited by varying their combination with such features as a new three-speed "Directionair" blower, rear register and "Economizer" grille and stack assembly. The blower takes in room air near the ceiling, mixes it with freshly heated air at the heater outlet and forces the tempered air directly to the floor. The rear register gives dual-wall advantages to single-wall models, delivering 20 to 25% of capacity into an adjoining room. The "Economizer" is a high-level assembly which reclaims waste heat.

Standard features of the new Coleman wall heaters include a new one-piece streamlined casing with tan baked enamel finish; corrugated combustion chamber which radiates up to 50% more heat into the air stream; a new pressed steel burner with hundreds of stainless steel ports; and 100% safety pilot. Each of the new units fits between standard 16-inch-on-center wall studs. The heaters extend only four inches into the room.

The Coleman Co.



Safety Shut-Off Valve

Handley-Brown Heater Co. has announced the addition of a small size shut-off valve to their present line of "Poly-Trol" automatic safety shut-off valves. This model is provided with either ⅜-in. or ½-in. tappings.

Poly-Trol is a fully automatic safety shut-off valve that functions instantly whenever an over-pressure or over-temperature condition occurs. Available in the smaller size, which is most suitable for either commercial or domestic installations, the valve is easily installed in the gas fuel line upstream from the regulator and downstream from the appliance manifold. It guards constantly against a regulator failure that would cause over-pressuring of gas fuel lines and appliances and also guards against gas-fed interior fires.

Poly-Trol has no constantly moving parts to wear out and is designed throughout for maximum life with a "Fairprene" diaphragm and cadmium plated metal parts. The valve is test pressure rated at 225 lbs. psi and has an operating pressure rating of 150 lbs. psi. Pressure shut-off settings, which range from 20 in. of water column pressure to 2 lbs. pressure psi, may be quickly and easily adjusted in the field. Exposure to a temperature of approximately 200° F. will actuate the valve's temperature shut-off. After an automatic shut-off has occured, it may be reset in a matter of seconds for continued sentinel duty.

The standard low pressure Poly-Trol is also available in ¾-in., 1-in., and 2-in. sizes for larger commercial installations. The high pressure valve is available in ¾-in., 1-in., and 2-in. sizes with pressure shut-off settings from 10 to 50 lbs. pressure psi.

Handley-Brown Heater Co.

5. Converter

Century Gas Equipment Co. has announced a new, improved converter or heat exchanger in their line of Century carburetors for L. P. gas.

The converter is precision-made of high efficiency aluminum alloy and

If you want Faster Filling *plus* Added Safety . . . *specify* Superior 1045

Superior's new 1045 bulk storage tank valve incorporates all of the operating and safety features that make for fast, safe filling. Here's why:

- Standard shut-off valve with POL outlet, ¾" inlet
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Superior valve & fittings company

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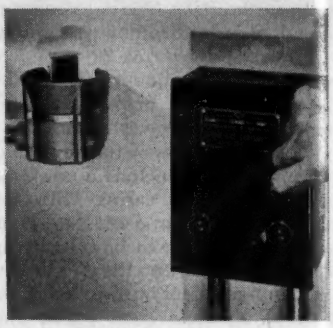
the coils are cast-in to eliminate gasket and connection problems. The back gasket is thinner and serves as a safety diaphragm. If the converter should freeze, this diaphragm takes up the expansion without damage to the coils or casing. In addition to its light weight and compact size, the unit resists corrosion from weather, hard water or chemicals such as antifreezes. It requires no adjustments after installation.

Century Gas Equipment Co.

6. Explosive-Gas Alarm

By keeping a continuous watch for the appearance of potentially explosive gases, this unit minimizes the danger of hazardous operations. The instrument consists of two units: a weather-resistant detector and a control box which is mounted at a remote location.

Operating by diffusion and convection, the flashback-proof detector senses the presence of combustible gas. At 0.2 of the lower explosive level a red indicator light is energized on the control box panel. As the hazard is removed, the red light extinguishes. Operating from standard 115-volt lines, the instrument features an all-electronic alarm circuit which is free from meters, meter-type



relays, and other delicate mechanisms.

Terminals are provided in the control box for the actuation of auxiliary audible alarms, for the control of motors or valves, or for the connection of repeater signals for distant points. Designed for convenient maintenance, the electronic chassis is easily removed and replaced with a spare.

Johnson-Williams, Ltd.

7. Multi-color Gas Log

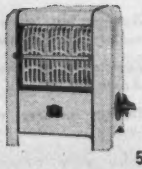
This lightweight log, which measures 24 in. wide by 16 in. high by 12 in. deep, is decorated by hand in permanent non-peeling silver birch or

oak finishes. Some of the features of the "NAGA" log are silent operation, high combustion frequency and rainbow color effect. Guaranteed not to crack or break, this gas log will not backfire or clog and has a 25,000 Btu hourly input. Special sizes of the "NAGA" log, which has a shipping weight of 25 lbs., can be made to order.

National Gas Logs, Inc.

Looking for the GAS HEATER LINE that SELLS? choose Martin

8 Fully vented Heaters 15,000 BTU to 85,000 BTU
22 Unvented Heaters 10,000 BTU to 50,000 BTU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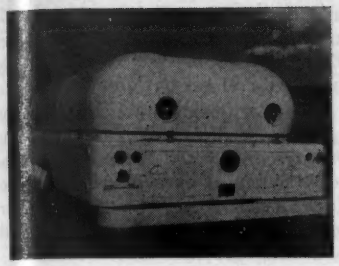


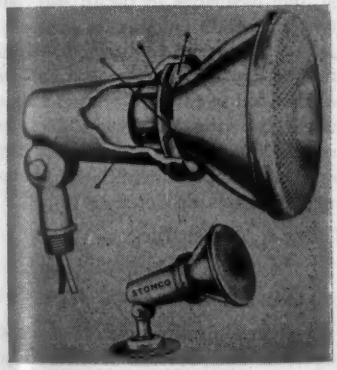
Product Information

8. Home Delivery Units

The new 1953 Lubbock Machine & Supply Co.'s home delivery unit features more protection, easier servicing and sturdier construction. The chrome handrail, which circles the base of the tanks, adds to the appearance of the truck, and the larger skirting and new location of the tank valves permit easier servicing.

The tanks are joined externally by a metal plate which gives them the durability of single-unit construction. The LMC home delivery units are available in 1400- to 2200-gal. capacities.

Lubbock Machine & Supply Co., Inc.



9. Lamp Holder

This new type of lamp holder, which is designed to prolong lamp life and end common lamp headaches in outdoor lighting, makes use of a high temperature, silicon rubber cushion-seal that hugs the neck of the lamp in a tight weather-proof seal that is reported to withstand the highest heat to which the lamp could be subjected and adverse weather conditions. The silicon cushion-seal is backed with an impregnated asbestos heat barrier and locked in place by a rigid aluminum reinforcing disc. It adapts itself to fit all R-40 and PAR-38 lamps whether long, short or off-center.

This new unit is made of non-corrosive cast aluminum with a glazed porcelain heatproof socket and comes completely wired with lead wires extending beyond a universally adjustable swivel arm that is threaded ½-in. IPS for mounting to ½-in. pipe, wall bracket, pipe slip fitter, or any of a number of standard interchangeable splice box accessories. It carries UL and CSA-approval for use with medium base or mogul reflector lamps in the standard 150W, 200W, 300W, and 500W sizes. Among their numerous applications, single lamp units provide supplementary highlighting for many types of outdoor illumination and display.

Stonco Electric Products Co.

New Publications

10. Radiator Heating

American Radiator & Standard Sanitary Corp.'s new 202-page radiator heating catalog is now being distributed. This source-and-date book contains up-to-the-minute information about the complete line of American-Standard radiator heating products.

Also included in the book is a 24-page section on modern application and installation practices.

American Radiator & Standard Sanitary Corp.

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NATURAL POWER
LP-GAS

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WHY YOU SHOULD
CHECK SUNRAY . . .

✓ 1 PROMPT DELIVERY.
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✓ 6 32 YEARS OF PETROLEUM EXPERIENCE.
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Yes, — 7 is a lucky number — but in this business LPG dealers can't depend upon luck alone. That's why SUNRAY can make *your* problems much easier. Prompt delivery service and a dependable source of supply means everything.

SUNRAY has plants that offer a full line of LP-Gases in Arkansas, California, Kansas, Louisiana, Oklahoma and Texas.

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11. Water Heaters

A new 24-page booklet, "Automatic Hot Water — Here's How and Why" has been prepared by the Dearborn Stove Co. and is now ready for mailing.

With its many diagramatic illustrations and information on proper installation and sizing of water heaters, this booklet also contains data on water and its consumption, recovery, pipe sizes, relief valves and magnesium anodes, and will serve as a manual for dealers and installers alike. It is intended to help dealers, installers and service men to avoid the common mistakes which cause many unnecessary service calls and complaints to help them better understand the "How" and "Why" of water heaters and hot water, and to promote better hot water service to the public in general.

Single copies of this booklet are available free, from the company.

Dearborn Stove Co.

12. Steam Boiler

Several models of the Eclipse type-D "Steamboilerplants" are illustrated and described in Catalog No. A-107, recently released by Eclipse Fuel Engineering Co. They are automatic gas-fired and gas designs.

The eight-page brochure lists the specifications and dimensions of the ASME-constructed boilers, typical applications of each model and a detailed explanation of the two different types of control systems, "Standard" and "Off-On".

Eclipse Fuel Engineering Co.

13. Graphic Panel Instruments

Bulletin 7090 from Minneapolis-Honeywell Regulator Co. describes the two newest additions to the Honeywell group of miniature graphic panel instruments: a liquid level indicator and a valve position indicator.

Consisting of two pages, this illustrated bulletin details the operations of the indicators and lists the specifications, characteristics and features of each.

Minneapolis-Honeywell Regulator Co.

14. Carbon Monoxide Detector

A new bulletin from Taller & Cooper, Inc. describes in detail the company's carbon monoxide detector, listing its special features, specifications and suggested installations. Also included in the bulletin is an illustrated functional description of the instrument and its components, and pictures of notable installations of the carbon monoxide detector.

Taller & Cooper, Inc.

15. Mecco Safety Marking Tools

Over one hundred different marking tools and devices are described and illustrated in the new 28-page Mecco safety marking tool catalog published by M. E. Cunningham Co. This brochure includes photographs of the various products; descriptive material; catalog numbers; and in cases where the information applies, charts of the various sizes.

The basic groupings of products in this catalog are as follows: stamps—made to order hand stamps, inspection and symbol stamps, letter and figure stamps, mold stamps and press stamps; marking machines and fixtures; special marking outfits; press and hand type holders; dies and die inserts; engineers and inspection hammers; and steel type.

M. E. Cunningham Co.

Hotter Heat per Penny

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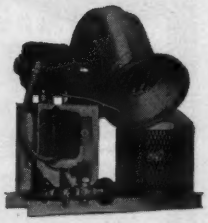

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Every day, more and more markets, factories, warehouses and offices are recognizing this revolutionary development in low-cost heating comfort, and are having it installed within a short time after inquiry.

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Approved as an unvented heater, circulator type, for commercial and industrial use. Is not affected by the State Housing Act of California.

Note This Exclusive Feature:
Now . . . Natural Gas or LP Gas-Air can be used on the SAME BURNER without changing orifice or pilot (with LP Gas-Air range between 1400-1600 BTU per cubic foot at proper pressure).

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The Part Tank Car Shipments Play In Getting LPG to Market

Underground Storage, Increased Production and Wider Usage Will Give Railroads Larger Returns While Better Serving the Industry

G. L. BRENNAN

By G. L. Brennan
Manager, LP-Gas Division, Warren Petroleum Corp., Tulsa, Okla.

CERTAIN phases of the liquefied petroleum gas industry's operations as they affect the railroad business will be covered in this paper.*

What are the prospects of future increases in the production of liquefied petroleum gases?

Additional sources of supply of these products can be expected from:

A. New oil and gas fields.

B. Higher extraction efficiency at existing natural gasoline plants.

C. Increased recovery at crude oil refineries as catalytic cracking capacity grows.

D. Large underground storage installations.

As new oil and gas fields are developed, gas processing plants will be installed in order to permit production of the crude oil in compliance with most state conservation laws, even though the financial returns from such gasoline plants may be unattractive. The efficiency, and likewise the gallons of L.P. gas produced at such new plants, would depend upon prices obtained for the products, additional investment costs, and taxes.

It is mechanically feasible to increase propane production of existing plants some 25% to 30% but, with present prices and the heavy tax load, much of this potential increase may

*Presented at the joint conference of LPG Shippers and Railroad Traffic Men sponsored by the Natural Gasoline Association of America in Tulsa.

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Heating systems for dryers and dehydrators	drying cotton, rice, fruit, etc.	cotton gins fruit and nut growers rice growers
Built-to-order standby plants	for original or supplemental gas supply	industrial plants municipalities schools

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not come on stream. Under an economy free of price controls, the law of supply and demand could be an influential factor in increasing present extraction efficiency.

Catalytic cracking capacity in oil refineries throughout the United States is growing at a substantial rate and additional propane extraction from the resulting light ends will be economically feasible in many cases, although much of this gas, because of location and composition, may find its way directly to chemical manufacturing rather than into the fuel markets.

During the calendar year of 1952, increases in liquefied petroleum gas production will be somewhere in the order of 8% to 10% above quantities produced in 1951 and over the next five years we can reasonably expect a 10% to 15% increase each year from the three sources mentioned above. Although these percentages do not match higher percentages in the past, we must realize that the same number of gallons increase each year represents a declining percentage of the total.

It can be seen, therefore, that with the movement by rail of only one-half of this new production the growth would be very substantial and could amount to as much as 22,000 to 30,000 carloads per year above an estimated movement today of about 273,000 carloads per year.

A new development of great importance to both the L. P. gas industry and the railroads has reached sizeable proportions in 1952, namely large capacity underground storage installations. You are aware of difficulties the industry has had in the past in supplying winter demands for these products in spite of the fact that on an annual basis there has never been an undersupply of L. P. gas. Summer surplus has often amounted to 10-15% of annual production. Production and transportation facilities have not been great enough during the winter months but have been way over capacity during the summer months.

Where Storage Is Located

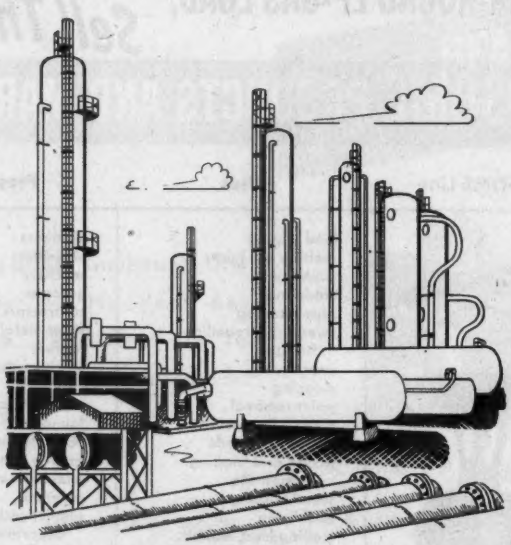
Storage capacity for conserving the excess summer supplies is composed of tanks at consumers' homes and distributors' bulk plants, at natural gasoline and refinery plants and to this list now may be added underground storage capacity located either at manufacturing plants or in and near consuming markets. Those underground installations near the markets have storage in-transit rates established by the railroads which permits more economical saving of the products and provides rail traffic that otherwise just would not exist.

This type of storage further enables the industry to take care of the unusually high demands during the winter months and, in another sense, constitutes increased production capacity that can be made available whenever required. In my opinion, underground storage of liquefied petroleum gases is one of the most important L. P. gas developments that has taken place in many years.

Underground storage installations are of two principal types. One is produced by washing salt out of salt beds or salt domes. Salt beds exist over a wide area of west Texas and western Kansas and are also found in eastern Michigan, Ontario, north-

CITIES SERVICE

LIQUEFIED PETROLEUM GAS



. . . in L. P. gas also Cities Service means Good Service

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- UNIFORM PRODUCTS
- A CAPABLE SUPPLIER
- TWENTY-FIVE YEARS EXPERIENCE

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western Ohio, northwestern Pennsylvania, and western New York state. Salt domes occur over a wide area along the Gulf Coast of Texas as far east as Alabama and are scattered inland a considerable distance in Mississippi, Louisiana, and Texas.

Salt brine has been washed out of salt beds and domes for a number of years for use in the manufacture of table salt and as a raw material for other chemicals so that washing techniques are not new. The use of these washed-out caverns for L. P. gas, however, is new to the industry but so far has not presented serious difficulties in storage or removal of the products.

Where Tank Cars Come In

A substantial amount of such storage is located in west Texas and the Panhandle adjacent to manufacturing plants. Part of this product will be required for local winter markets but a substantial amount will, of necessity, move out of those territories by tank car which again is additional business for the railroads, providing that a sufficient number of tank cars are available to move these quantities which are over and above normal daily plant production.

To the extent of rail movement of such stored products it can readily be seen that the installations near the markets and handling on an in-transit basis have distinct advantages in that part of the rail movement occurs during the off season in the summer and the balance of the movement, much shorter than the complete haul, can be handled easier when winter comes, thus reducing the total number of tank cars required. Underground storage capacity located nearer the markets is of great advantage to all elements of the industry and to the railroads. A fair and reasonable point of view by the railroads of in-transit charges can have an important influence to such a program.

The other type of underground storage is a simple mining operation in formations suitable for such use. A shaft is sunk to the proper depth and formation and a large room or cavern mined out by conventional mechanical mining methods. The shaft, with proper connections installed, is then sealed off with concrete and you have a large underground tank.

A great deal of exploration work in locating suitable geological formations, particularly in the Mississippi Valley, has been under way for some time, a considerable amount of core drilling has been completed and a sizeable number of such caverns are either under construction or will be constructed in the not too distant future. Although the first caverns of this type were constructed by our company at our Breckenridge, Texas, plant, our own plans for future caverns of this type are to locate them near our markets so that they may be used for taking care of local demands and in-transit movement for our markets beyond such points.

The total capacity of such underground installations is sizeable and something the industry has needed for years but, even with completion of all installations now contemplated, the total product that will be stored probably won't amount to more than a 10 to 15 day supply against winter demands, which compares to some 60 days' supply of heavy fuel oil in

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Blodgett's rocket fast PYRA-STOVE is ideal for stock pot work with its great flexibility and convenient work height. Rated at 100,000 B.T.u.

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primary storage and a somewhat greater number of days supply of light fuel oil and gasoline in primary storage.

Considering the youthfulness of the L. P. gas industry and high storage costs, it is evident that some very substantial progress is being made. A survey conducted by PAD early this year shows that dealers' and distributors' bulk plant storage amounts to a little over 100,000,000 gallons or about 10 days' supply; thus, it can be seen that the additional underground storage capacity is important.

Will additional markets for this new production be found?

A recent census figure shows approximately 42,000,000 homes in the United States with approximately 25,000,000 using utility gas or L. P. gas as their cooking fuel, leaving approximately 17,000,000 dwelling units that do not use gas. Many of these use electric ranges for cooking but there are still about 10,000,000 homes still using coal, wood, kerosene, and other low form fuels. This means the L. P. gas distributor still has a large potential market in which to sell these products.

Sizeable quantities of L. P. gas are used for home heating in the South and such use is being developed farther north where volume requirements during winter months are considerably higher than they are in the Southern states; hence, as this use increases, larger volumes of L. P. gas will be required.

The use of L. P. gas by industry has not fluctuated greatly during the last few years, particularly since the distribution of lower cost natural gas has become more widespread. It is not now believed that large industrial use will be a factor in the future growth of L. P. gas sales.

The increasing use of LPG in internal combustion engines is of great interest. For a number of years oil well drilling rigs, oil well pumps, and other heavy duty equipment in the oil fields have operated very successfully and economically on it. Irrigation pumping engines have used these fuels in a great many territories, particularly the High Plains of west Texas and in the rice producing areas of the Gulf Coast and Arkansas. Such type of irrigation in other areas is showing signs of future growth .

Motor Use Is Large

A few years ago one of the passenger bus manufacturers brought out equipment designed for using these fuels and several hundred of these buses are now in successful operation in several cities. The L. P. gas industry, itself, has used these products as motor fuel on tank trucks for a number of years and their use by common carrier freight truck lines has many future possibilities.

One of the biggest new developments is the use of LPG in farm tractors. This use has shown remarkable growth in the last three or four years, even to the point where all of the principal farm tractor manufacturers now factory equip their tractors for using propane and butane. This use provides a load during the warmer months of the year, offsetting, to a considerable extent, the demand arising from house heating.

In other words, it provides a summer market for production in excess of other demands, gives the distributor greater use of his distribution facilities, and provides the farmer with a high octane, low cost fuel for his tractor. As this market develops in areas distant from producing point, increased rail traffic during the summer months will result.

The chemical industry continues to

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Kool Kontrol Panel the scientifically *slanted* knobs can't overheat—and women like their extra convenience!

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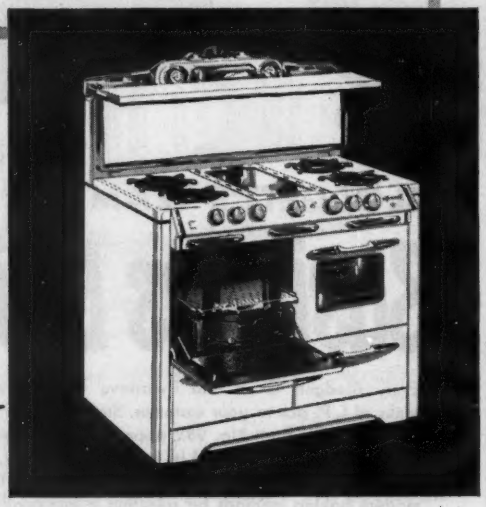

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Want to start the New Year right? Feature the O'Keefe & Merritt Automatic gas range. Your sales will grow, because customers appreciate the many worksaving advantages no other range can offer. There's extra *value* for homemakers—extra *profit* for you with O'Keefe & Merritt—America's Most Modern Gas Range!

O'KEEFE & MERRITT CO. 3700 E. OLYMPIC BLVD., LOS ANGELES 23, CALIFORNIA

use increasing quantities of these light hydrocarbons in manufacturing chemicals and this trend is expected to continue for sometime in the future. New plants for using butane and propane are now under construction and it is indicated that others will be built in the future. Most of these projects are located directly adjacent to or near points of production so that the movement of the raw material is handled most economically by pipe lines; nevertheless, the chemical products made in such operations add materially to rail traffic.

It would appear, therefore, that sales of L. P. gas will continue to enjoy a healthy increase in the future, although such a statement must be qualified with respect to the conditions that the L. P. gas industry must:

A. Do a good selling job.

B. Materially improve consumer service.

C. Keep competitive with other high form fuels, and that

D. No serious setback in national income occurs and some measurable reduction in individual income taxes is brought about.

What developments may be expected in pipe line and marine transportation of L. P. gas?

L. P. gas has been transported successfully by pipe lines for a number of years and the techniques of handling large quantities over long distances are fully developed.

No statistics are available on the volumes of products moved in pipelines, although it is substantial and indications are that larger quantities will be handled in the near future, particularly between the Texas Panhandle and Chicago. These products are batched in the lines along with other light products, are blended with them in some cases; and large quantities of butanes are mixed with crude oil for pipe line transportation to oil refineries.

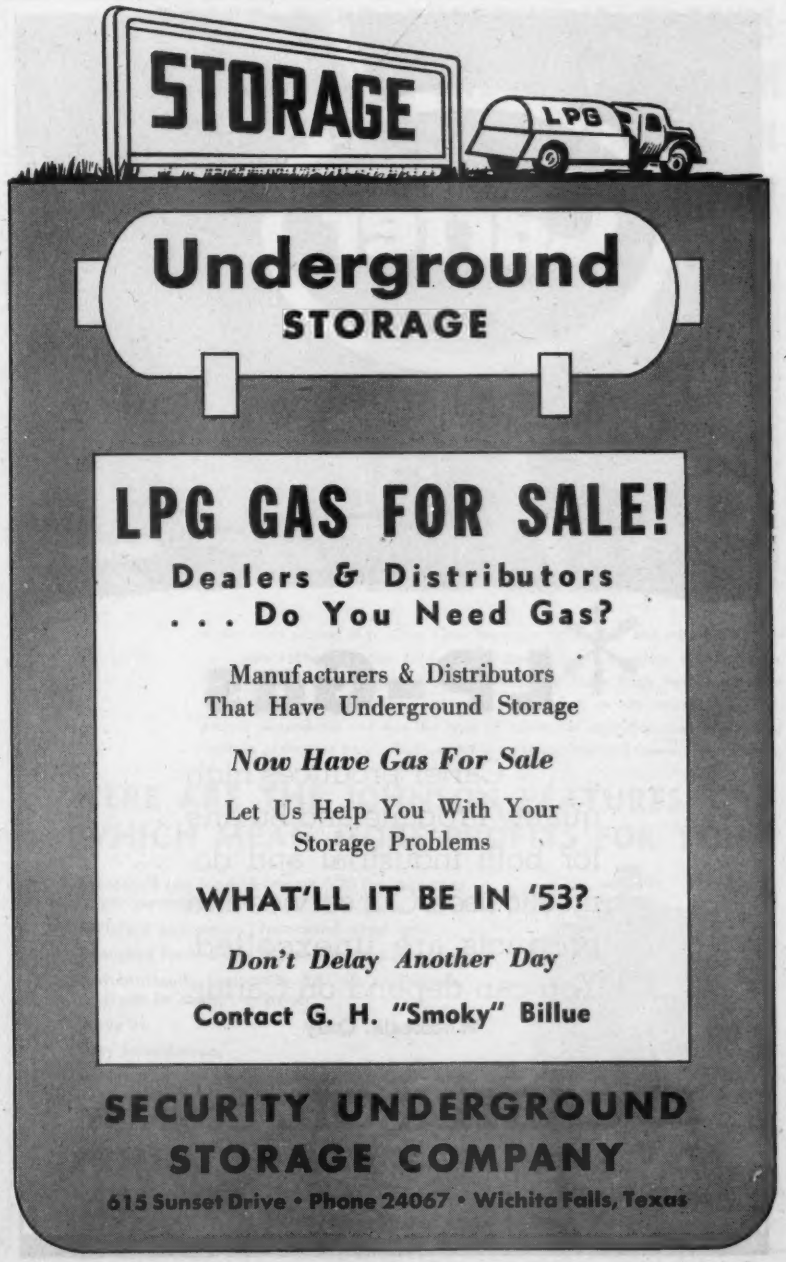
Marine transportation of L. P. gas by means of tank ships and barges has been developed since the war. My own company operates a tank ship between Houston and Newark, N. J., and has three barges operating in the inland waterways along the Gulf Coast as far east as Panama City, Fla.

Two tank ships devoted exclusively to L. P. gas are now operating between the Gulf Coast and Brazil while there are at least three oil tankers in foreign service handling small part-cargoes of LPG.

Ocean transport to other countries in the Western Hemisphere will increase as markets for these products in such countries are developed. Some increased rail traffic may result in the movement of supplies from inland producing plants to terminal loading ports as such export volumes increase.

Economical barge movements may well be developed in the future but at the present time are somewhat limited. Ideal situations with production on the water and large scale use at the receiving end are combinations not frequently found. Where they may develop, however, additional barge movement can be expected.

One important element in marine transportation of L. P. gas in the United States as compared with marine transportation of other petroleum products is the fact that LPG is largely used out in the country



away from larger centers of population whereas gasoline and fuel oil find their largest markets within the centers of population. Hence, L. P. gas moved to river or coast terminals has an added inland freight and distribution cost on a higher percentage of the products thus handled than would be the case with gasoline or fuel oil.

Other important cost differences are those of the necessary high pressure tanks for barges, terminals, tank cars or trucks. Capital charges on such items are high and a sizeable part of the total costs.

Future rail freight rates will have a major influence on the growth of pipe line and marine transportation of L. P. gas. This same factor in the past has had a marked effect on the amount of these products moved by tank truck; hence, it would appear that the railroads could devote considerable study to this problem of competition of other forms of transportation of L. P. gas.

In this free enterprise system of ours, constant effort is directed toward cutting transportation costs of all commodities and where the cost of transportation of L. P. gas equals or, in so many cases, exceeds the value of the product many are putting a powerful searchlight on the figures to find savings in such costs.

The possibility of pricing ourselves out of much present and future business needs to be studied. We in the L. P. gas business have had one such experience and we are wary of its reoccurence.

Referring to the title of this discussion, "Trends in the L. P. Gas Business Influencing Rail Traffic," we can summarize briefly as follows:

1. Future production of L.P. gas probably will increase at substantial rates and could be 10% to 15% per year for at least five years.

2. Markets for L.P. gas will continue to expand, depending on competent salesmanship and favorable economic conditions.

3. Competition with rail movement by trucks, pipe lines, and by water will depend to a large extent upon rail freight rates in certain areas.

4. American railroads will continue to enjoy an increasing revenue from the L.P. gas industry.

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4,110,000,000 Gallons Sold In '52

(Continued from Page 76)

rubber (e.g., cold rubber), unstable prices for natural rubber and the necessity for maintaining a healthy domestic synthetic rubber industry, there is no question but what this market should continue.

Safety

The industry continues to manifest strong interest in safety through participation in fire schools and demonstrations, through service schools and in their development and maintenance of safety standards commensurate with engineering and utilization advances in the field. The American Petroleum Institute LPG Committee is presently developing standards for the design and construction of LPG facilities at gasoline plants, refineries, tank farms and marine terminals. Proposed changes

and additions to the NFPA and NBFU Standards (Pamphlet No. 58) for the Storage and Handling of Liquefied Petroleum Gas are under consideration by various industry committees of the Liquefied Petroleum Gas Association and the Compressed Gas Association.

Supply

As the industry entered the winter of 1952-1953, the supply appeared to be adequate. However, an unusually severe winter could tip the balance and create a shortage. A sizeable increase in production is expected next year from plants now being completed or under construction. Many refineries are finding it to their advantage to extract and sell propylene and butylenes for chemical use and others to convert these hydrocarbons into motor and aviation fuel by polymerization and alkylation. L. P. gas now represents nearly half of all liquids produced at natural gasoline plants.

Storage

Underground storage of liquefied petroleum gas in caverns washed out of salt beds or salt domes; or in caverns mined out of suitable formations is increasing. Present underground storage capacity for L. P. gas is nearing 3,000,000 barrels (126,000,000 gallons). Over twice this amount of such storage is under construction or under active consideration. This type of storage, however, is not the answer to the industry's problem of seasonal demand vs. year-round production. L. P. gas storage is a problem of all phases of the industry. There must be a balance of storage between the producer, bulk-distributor and consumer. The development of a good summer load (demand) and the maintenance of low winter to summer ratio still demands full attention of industry. The "National Committee for LP-Gas Promotion" has developed a storage program which has been of assistance in establishing a trend toward such a balanced storage program.

Transportation

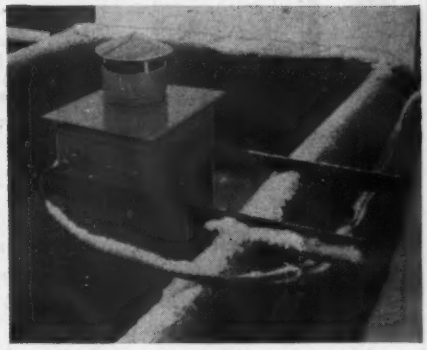
The movement of propane by pipe line from Texas to the Chicago area was begun this year and a third L. P. gas barge was put in service.

Transport truck movements of LPG continued to increase. The steel strike slowed delivery of new pressure tank cars to the industry. It is estimated that 2600 new tank cars were added to the fleet this year bringing the total L. P. gas tank car fleet to 17,100. Many pressure cars expected to be delivered in 1952 will not be delivered until 1953. The need for low cost transportation of L. P. gas continues to be a major factor in the industry's ability to expand its markets and sales.

Outlook

Recently completed production facilities, plus plants now under construction, together with increased transportation facilities, should provide additional large amounts of L. P. gas in 1953. Aggressive sales and suitable sales promotion efforts will be needed to sell the additional production.

BOOST YOUR CUSTOMER'S PROFITS THROUGHOUT THE WINTER WITH WARMER WATER FROM A JOHNSON AUTOMATIC LP-GAS STOCK TANK HEATER



Here's the stock tank heater adaptable for any tank . . . concrete, wooden or steel. A LP GAS STOCK TANK HEATER means ICE-FREE water (see illustration at right) . . . instead of partially free water.

It has been proven that warm water increases beef gains and milk production . . . also cattle take less feed when warm water is available during winter months. The Johnson Water Warmer Automatic Stock Tank Heater will give you all of these advantages and will pay for itself in one season. It's completely dependable and has the type of automatic operation that means less work in caring for herds. Guaranteed completely free of condensate problems.

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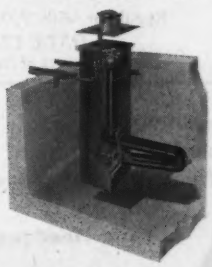
- **Increased gas load. Average 600 lbs. per year per customer.**
- **Satisfied customers. Increased good will.**
- **Designed for the job. No condensate problem.**
- **Automatically maintains 48° water temperature in coldest weather.**
- **Stays lit.**
- **Easy installation.**
- **Recommended by leading distributors and merchandisers of bottled gas.**



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H. E. Brumder

Herman Merker, president of *Pressed Steel Tank Co.*, manufacturer of Hackney gas cylinders, has announced the appointment of Herbert E. Brumder as general manager of the Downingtown Iron Works Division, Downingtown, Pa., and the appointment of Milton F. Kroesch as chief engineer of its Milwaukee operations.

Mr. Brumder joined Pressed Steel Tank in 1939 and has served the company most recently as chief engineer.

Mr. Kroesch joined Pressed Steel Tank in 1937. His most recent assignment was that of chief of research and development.

Theodore E. Mueller, president of *American Radiator & Standard Sanitary Corp.*, returned to Pittsburgh recently following an eight-week tour of the company's European plants.

During his business trip, Mr. Mueller officially opened a new pottery which the firm has erected in Brescia, Italy. In this act he was honored by the Italian Government when it presented him with that country's Order of the Star of Solidarity for his role in the reconstruction of Italian industry.

C. S. Davis, Jr., president of *Norge Heat Division*, Borg-Warner Corp., Kalamazoo, Mich., recently announced the appointment of H. Forrest Oakes as regional sales manager for the Southwest territory.

The territory of Mr. Oakes includes southern Illinois, southern Indiana, Kansas, Missouri, Oklahoma, Texas, Arkansas, Louisiana and Mississippi.

Early in 1953, one of the largest stove and furnace manufacturing plants in Canada will begin assembly operations on *Perfection Stove Co.*, products for distribution in Canada.

The Empire Stove & Furnace Co., of Owen Sound, Ontario, has been given exclusive manufacturing and distributing rights for the complete Perfection product line, in Canada.

Perfection Stove Co. has been building and assembling all products for sale in Canada in its two plants in Cleveland.

Proposed consolidation of U. S. Machine Corp., Lebanon, Ind., with *Stewart-Warner Corp.*, Chicago, is announced by J. S. Knowlson, president

of Stewart-Warner, and Carl J. Winkler, president of U. S. Machine.

U. S. Machine, founded in 1937, is known nationally in the heating equipment field.

Cecil M. Dunn

Election of Cecil M. Dunn as as president and Robert A. Seidel as chairman of the board of the new *RCA Estate Appliance Corp.*, is announced by Frank M. Folsom, president of the Radio Corporation of America.

This announcement followed the action of stockholders of the Noma Electric Corporation approving the sale to RCA of the Estate Stove Co. of Hamilton, Ohio. Estate Stove Co. becomes a wholly-owned subsidiary of RCA.

Last month Mr. Dunn was also elected president of the Institute of Cooking and Heating Appliance Manufacturers.

Mr. Dunn was formerly president of Estate, and Mr. Seidel is a vice president of RCA. Other newly-elected officers of RCA Estate Appliance Corp. are Gordon Kemp, vice president and treasurer; Ellsworth Sims, vice president in charge of manufacturing; Loretta Welsh, secretary; Robert Ireland, comptroller; Robert Isinger, assistant treasurer; and Margaret Stevenson, assistant secretary.

Harry C. Gurney, sales manager of Janitrol domestic-commercial division of *Surface Combustion Corp.*, announces the transfer of G. Warren Stark, sales engineer, from the Cleveland district to Louisville, Ky.

In this new capacity, he will serve the entire state of Kentucky and the southern counties in Indiana in the sale and service of Janitrol space heating equipment.

Election of Charles S. Mitchell as vice president of *Cities Service Oil Co. (Del.)* is announced by S. B. Irelan, president of the company, following a meeting of the board of directors held in Bartlesville.

Mr. Mitchell is a member of the board of directors of Cities Service Oil Co. and president of Cities Service Pipe Line Co.

Louis C. Upton, chairman of the board and founder of *Whirlpool Corp.*, died in Niles, Mich., Oct. 9. He was 66 years old.

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...Without Charge

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- The Progress of the Industry and the History of its Development.
- The ABC of LP-Gas, an Introduction to LP-Gas Operations.

PHYSICAL AND CHEMICAL PROPERTIES
- Properties of the Hydrocarbons in LP-Gas.
- Properties of Butane-Propane Mixtures
- Volume Correction Factors
- Analytical Determination and Testing

PRODUCTION OF LP-GAS
- Natural Gasoline Plants, Recycling Plants, Oil Refineries

TRANSPORTATION AND STORAGE
- Delivery by Truck, Rail, Water, and Pipe Lines
- Storage Tank & Pressure Vessel Design
- Liquid Metering and Pumping Systems

UTILIZATION OF LP-GAS
- Comparative Performance with other Fuels
- Appliance Installation and Testing
- Domestic Applications
- Commercial Applications
- Industrial Applications
- Enrichment, Peak Load and Standby Uses
- A Fuel for Internal Cumbustion Engines

DISTRIBUTION OF LP-GAS
- Installing and Servicing LP-Gas Systems
- Semi-Bulk Systems
- Bottled Gas Systems
- Gas Utility Service from Central Plants
- Multiple Utility Service from a Central Plant

REGULATIONS
- N.B.F.U. Pamphlet No. 58 (1947).
- Motor Carrier Regulations
- Freight Regulations
- Unloading Tank Cars
- Marine Regulations

APPENDIX
- LP-Gas Insurance
- Handy Tables for Field Use
- The Interchangeability of Other Fuel Gases with Natural Gases
- Flame Weeding
- Bibliography
- Glossary of Terms

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F. DeLarzelere

After spending the last 12 months in agricultural and miscellaneous survey work for the Boardman Co., of Oklahoma City and Tulsa, Frank DeLarzelere has resigned to form his own company, *The Specialty Engineering & Sales Co.*, with headquarters in the Wright Bldg., Tulsa, to represent, as a manufacturers' representative, several well known makers of pressure vessels, flame cultivators, anhydrous ammonia applicators, and other lines related to the L. P. gas and anhydrous ammonia industries.

Leland Manufacturing Co., of Leland, Miss., pioneer manufacturers of anhydrous ammonia equipment, L. P. gas flame cultivators and tank trailers for these industries, has appointed the DeLarzelere company as exclusive sales representatives.

Frank DeLarzelere, owner of the new firm, has been associated with the L. P. gas industry since 1935.

The apointment of Paul B. Wishart to the newly created position of general manager of *Minneapolis-Honeywell Regulator Co.*, and his election to the board of directors was announced recently by Harold W. Sweatt, president. He continues as vice president.

Mr. Wishart has been with Honeywell for 11 years, and since 1945 has been vice president in charge of manufacturing in the company's Minneapolis plants.

John Fendya has been selected as plant manager of the St. Louis division of *Magic Chef, Inc.* Mr. Fendya will assume responsibility for manufacturing operation of the St. Louis division, which produces Magic Chef domestic gas ranges and various government defense items.

The company has also announced that R. B. Matthews has become export sales manager, succeeding C. S. Rogers. Mr Matthews will direct all sales of the company's domestic gas ranges, commercial cooking equipment, and gas heaters to foreign distributors.

Additional appointments made were: W. D. Ward, office manager of the northern sales division, Chicago; S. E .Peterson, office manager of the southwestern sales division, St. Louis; R. G. Morton, office manager

of the Atlantic sales division, Philadelphia; and C. R. Saeli, office manager of the eastern sales division, Long Island City.

L. A. Dixon, Jr., vice president, meter and valve division, *Rockwell Manufacturing Co.*, has announced the appointment of R. A. Johnson as Atlanta district sales manager of the company. Mr. Johnson will be responsible for the coordination of all meter and valve division sales in his district.

William M. Connor has been named general manager of the company's Macnick division, which manufactures orifice meters.

Additional appointments in the meter and valve division include Howard J. Evans as chief engineer and Robert J. Sarraf as chief chemical engineer.

J. F. Donnelly

James F. Donnelly, who has been assistant general manager of the A. O. Smith Corp. water heater division, has been named vice president in charge of sales for *Servel, Inc.*, it is announced by W. Paul Jones, president of Servel.

Mr. Donnelly, who recently succeeded Louis Ruthenburg as president of the Gas Appliance Manufacturers Association, fills a vacancy caused earlier this year when John K. Knighton resigned to become president of the Knighton-Keune Co., Servel distributors in Miami, Fla.

During Mr. Donnelly's eight-year tenure with A. O. Smith, he also served as sales manager and marketing director for the Kankakee, Ill., firm.

Previously, from 1923 to 1944, Donnelly held several executive posts, including that of general sales manager, with the Bastian-Morley Co., of La-Porte, Ind., manufacturers of heating equipment and water heaters.

Phoenix, Ariz., was the location during the week of Nov. 17 of a meeting attended by all district sales managers and certain administration personnel of *Peerless Pump Division*, Food Machinery and Chemical Corp.

The meeting was directed by G. F. Twist, FMC vice president and Peerless divisional general manager, and chairmanned by B. A. Tucker, Peerless divisional sales manager.

37 VIKING LP-GAS PUMP Models From Which To Choose

Look to Viking for the complete line of LP-gas pumps. 37 models include motorized bulk station units, farm dispensing, truck mounting and a hand drive type.

All power driven units available with either mechanical seal or metallic packing. Sizes range from 5 to 55 gallons per minute.

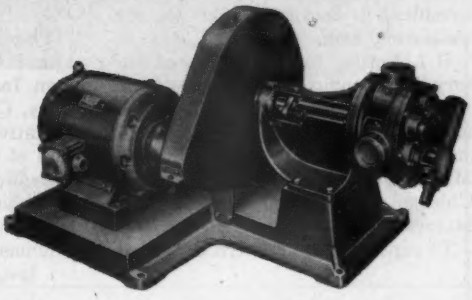

FIG. 181—GEAR DRIVE BULK STATION LP-GAS PUMP

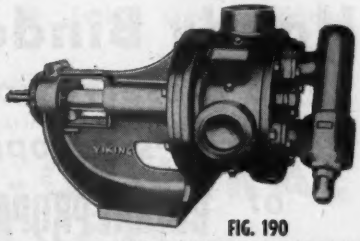

FIG. 190
TRUCK MOUNTING LP-GAS PUMP

FIG. 57A1—HAND DRIVE LP-GAS PUMP

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A tried and proved mechanical seal, tested in the field under actual operating conditions, is now available on all power driven Viking LP-gas pumps.

This simple, positive seal built particularly for handling dry liquids is located directly behind the pump rotor. This location enables the seal to run in the liquid being pumped making for still longer and better service.

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INCINERATION DIVISION, BOWSER, INC., CAIRO, ILL.

Two new regional sales managers have been established by *General Controls Co.* following its recent opening of a manufacturing plant in Skokie, Ill., states J. F. Ray, vice president in charge of sales for the California firm.

B. L. Lerch, formerly Chicago factory branch office manager, has been appointed regional manager for the Middle-Western territory and will supervise General Controls offices in Minneapolis, Milwaukee, St. Louis, Chicago, Indianapolis, and Des Moines.

To supervise the Eastern Seaboard area, General Controls also has named Russell Strongman as regional manager, covering factory branch offices in Newark, New York, Hartford, and Boston.

Thomas Truck & Caster Co., Keokuk, Iowa, has appointed A. D. Bowman, Inc. with main offices in Waterbury, Conn. as the exclusive representative in the Southwestern section of Connecticut.

President of the organization is A. D. Bowman. Bowman's branch office in Boston, Mass. has represented Thomas for several months.

Handy Binder

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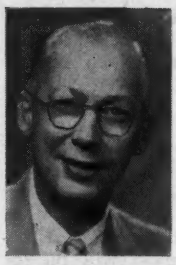


R. E. Fetzer

Rodger E. Fetzer has been appointed western regional manager of the *Tappan Stove Co.*, A. B. Ritzenthaler, vice president in charge of sales announces.

Mr. Fetzer will supervise and coordinate all sales and merchandising in the four Tappan sales districts west of the Rocky Mountains. He joined the Tappan sales organization in July, 1950 and was formerly with Sears, Roebuck and Co., Newark Stove Co., and Roberts and Mander Stove Co.

He will reside in Los Angeles.

Two new territory managers have been added to the Tappan sales organization. R. L. Jones has been assigned to the northwestern Pennsylvania territory, replacing G. M. Yeingst, who died on Sept. 1.

E. E. Strain, Jr., a native of Georgia, is the new Tappan representative in that state. Prior to joining the Tappan organization, Mr. Strain was a gas appliance representative in Georgia for two wholesale distributors.

John E. Angst, sales agent for the *American Car and Foundry Co.* in Chicago, has been appointed assistant western sales manager, according to Frederick H. Norton, vice president in charge of sales.

Mr. Angst, who will continue to make his headquarters in Chicago, will report directly to John H. VanMoss, western sales manager.

General Water Heater Corp., of Burbank, Calif., is opening a factory distribution warehouse in Minneapolis to serve both Minnesota and Wisconsin. Al Bailey, 5056 Bloomington Ave., Minneapolis. will be in charge of sales and distribution.

Details of colorful motor transportation operations and profile views of two key trucking industry figures featured the November, 1952, issue of "International Trail Magazine," published by the *International Harvester Co.*

Liquefied petroleum gas is the basis for two other feature stories. International's introduction of the industry's first factory-built LPG-powered trucks with Underwriters Laboratories-listed equipment is described in one, "Buried Treasure—LPG"; the other describes how 16 million gallons of the fuel are stored in the earth's

natural underground structure near Gibsland, La., and Hattiesburg, Miss. General Gas Corp. and Delta Tank Manufacturing Co., Baton Rouge, La., own the unique caverns. One of the firms distributes liquefied petroleum gas; the other manufactures LPG tanks and International truck fleets figure in both operations.

Carl E. Johnson, a veteran of 19 years' service as engineer at *Scaife Co.*, Oakmont, Pa., has been appointed chief engineer.

A. V. Murray, president, also announces that E. T. Robbeloth will continue as executive engineer and Walker N. Green as plant engineer; James S. Shuster was appointed product engineer of the pressure vessel division.

Mr. Johnson's new responsibilities will include engineering functions in connection with all new products and processes, and plant improvements, as well as supervision of all engineering activity for Scaife pressure vessels for liquefied petroleum gas and other cylinders and tanks.

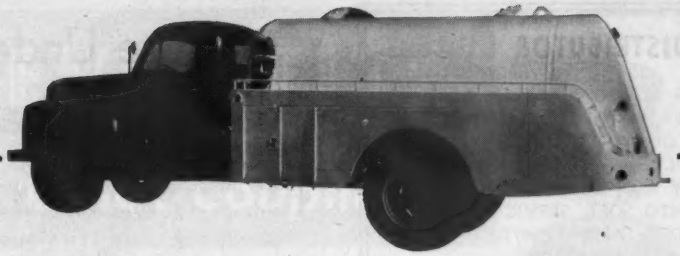
Rheem Adds Two New Wall Heaters to Line

Two new gas-fired vented wall heaters for natural, manufactured, mixed and L. P. gases have been added to the heating equipment line of the Rheem Manufacturing Co., it is announced by C. V. Coons, Rheem general manager.

The new heaters, developed and produced by Rheem's heating equipment division, will be known as "Model 1801" in the trade. Designed for installation between standard wall studding, the units are available in single, or dual wall types with 28,000 and 50,000 Btu inputs respectively.

The Model 1801 wall heaters contain all-steel electrically-welded heating elements of thermal fin design which have been porcelainized inside and out for long-life durability. Other features are built-in draft diverters, enclosed controls and Fiberglas insulated casings which are finished in neutral ivory baked enamel and are standard with both model sizes. Casings are 17" wide, 60" high, and project 5" from the wall.

For use in small homes, motels, hunting lodges, small commercial buildings, etc. where space is at a premium, the Model 1801 wall heaters are available with manual, or thermostat controls. They have been approved by the American Gas Association Laboratories.



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More Underground Storage Needed at Marketing End

THE latest report on underground storage of L. P. gas in cavities, recently released by the Petroleum Administrator for Defense, lists 77 projects in 12 states, with nearly 88 million gallons of storage capacity in use, and approximately 252 million gallons under development or authorized for immediate construction.

Reports of a few additional projects have been received since the PAD report was issued. The installations listed in these reports are all underground caverns, with impervious walls, from which it is possible to bring out exactly the same gas mixture that is put in.

Besides these cavities, there are also a few storage projects of indeterminate capacity, in which L. P. gas is being pumped back into depleted oil fields. These present problems of cost, recovery, and re-purification, which make such storage less attractive than cavity storage in salt deposits, and limestone or sandstone structures.

Considering the short time since underground storage was first undertaken, the record is impressive. The locations of the underground storage cavity projects, as summarized in the PAD report, are shown in Table 1, (figures converted from barrels to gallons). Seventy percent of the storage capacity now in use and under development is in the states of Texas, Louisiana, and New Mexico. Most of these installations were put in by large producing companies. This is not surprising. These three states, plus Oklahoma, are dominant pro-

UNDERGROUND STORAGE

State	No. of Projects	Capacity (Gallons) In Use	Capacity (Gallons) Ultimate
Illinois	3		21,000,000
Indiana	1		2,100,000
Kansas	2	1,050,000	3,150,000
Louisiana	7	17,430,000	26,250,000
Michigan	2	4,200,000	8,400,000
Mississippi	5	8,400,000	21,000,000
Missouri	1	1,050,000	1,050,000
New Mexico	9	11,130,000	21,630,000
New York	1		1,050,000
Oklahoma	1		2,100,000
Texas	43	44,373,000	131,355,000
Wisconsin	2		7,140,000
Total	77	87,633,000	246,225,000

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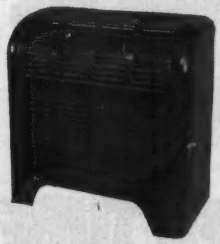

Model 914-V is A G A approved — made for all gases. It is very efficient in operation and provides clean, dry heat; there is no sweating of walls or windows. The valve is safely located behind a closed side door. Finished in brown porcelain enamel. 19" high, 9" deep. Made for 14,000, 17,000 or 20,000 B.T.U.

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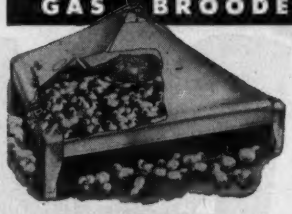

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ducing areas. Suitable salt deposits, in which cavities can be produced at a fraction of the cost of storage in steel, are widely distributed. The big producers have the gas, the salt structures, and the money.

Putting the surplus L. P. gas in storage near the point of production does not answer all of the problem. There are important marketing areas which are not located near the large producing states. Surplus gas stored in Texas, and burned during the winter heating peak in New York, Pennsylvania, New England, or any of the other large consuming states in the northern part of the country, must be transported during the peak heating season. With a shortage of tank cars in relation to the period of peak demand, and tank cars standing idle through the slack season, transportation still constitutes a potential limitation on the amount of gas that can be moved from storage to consumer.

Would Help Distant Markets

Construction of more underground storage facilities close to these outlying major markets would help to equalize the seasonal use of the tank car fleet, enabling the same number of cars to deliver more fuel by making more trips per year. It would also give marketers in these areas protection (which does not now exist in adequate measure) against interruption of supply by strikes, floods, or other conditions beyond their control.

The installation of storage caverns in salt deposits, as in the Texas-New Mexico-Louisiana area, will not be possible in a large portion of the Northern and Northeastern marketing region. Known salt beds are located below much of the lower peninsula of Michigan, and south and east of Lake Erie, underlying portions of New York, Pennsylvania, Ohio, and the tip of West Virginia. Outside this relatively small zone, all underground storage must be mined out of solid rock. It is a lot less expensive to drill a hole into a salt deposit, and wash out a storage cavity with a stream of water, than it is to send hard rock miners into the earth with tools and explosives, and excavate solid limestone, sandstone, or shale. But this is the way the job will be done throughout most of the Northern and Northeastern states. And unless the big producing companies take care of their own reserve storage

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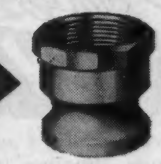

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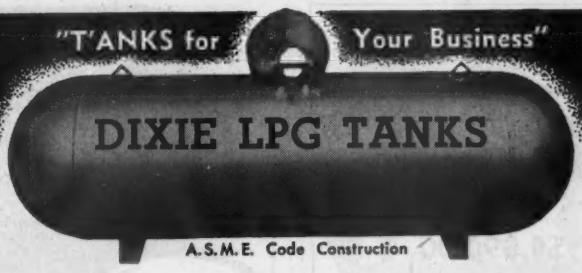

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Necessary EVIL

Sure, packing a pump is a nuisance. Whether it's necessary or not, depends on whether you have one of the new Corken mechanically-sealed LEAKPROOF Pumps. If you don't, better order Corkenpak, the specially compounded plastic, molded to fit shaft and box perfectly. Non-porous; propane can't get through it. No lubrication needed. Just give us the name and model of your pump. Corkenpak will keep it free from leaks at less cost and with fewer re-packings, until you're ready for your new mechanically-sealed, LEAKPROOF Corken pump.

A PAIR OF THESE MAY HELP:

Pulling packing out is safer than blowing it out. Use a pair of Corken Flexhooks—No. 1 size for small shaft pumps, pair, $2.90. No. 2 for large pumps, pair, $3.00.

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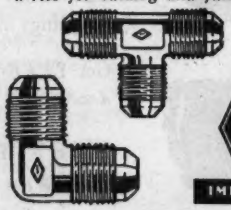

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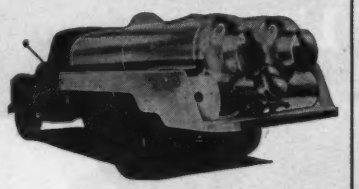

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1320 gallon single propane tank, pump, hose piped complete, ready to use, mounted on *NEW* 2 ton Chevrolet, 2 speed axle.

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All sizes tanks and trucks, single or twin, 600 gallon to 2000 gallon.

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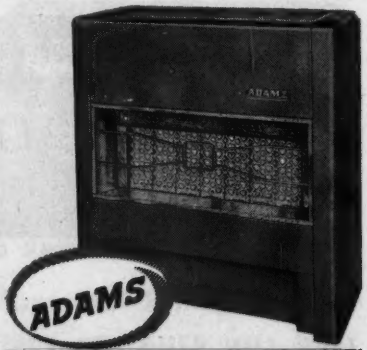

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Fully automatic with capacities to handle moderate to heavy heating loads. CHEERFULATORS supply finest heating qualities at low gas consumption rates. Four models available.

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at the marketing end, financing the production of the caverns may become something of a problem.

Producers have already installed underground caverns in Northern areas. Cities Service Gas Co. has a large salt-bed storage plant at Lowell, Mich., and Phillips Pipeline Co., subsidiary of Phillips Petroleum Co., has been working on a limestone excavation near Kankakee, Ill.

A few distributor organizations are undertaking to provide their own underground storage facilities. Records show these distributor-financed caverns either in use or under development: General Gas Corp., near Baton Rouge, La.; United Petroleum Gas Co., near Maiden Rock, Wis.; Suburban Propane Gas Co., in western New York; Enterprise Petroleum Gas Co., Mt. Enterprise, Texas; and Dri-Gas Corp., with two caverns near Chicago.

It is quite likely that groups of distributors will get together and create underground storage facilities for their joint needs. There is already a start in this direction in the Freestone County Underground Storage Co., of Fairfield, Texas. This company, now operating a salt dome cavity near Fairfield, was organized and financed by J. A. Farrar, of Waco; Morris Snead, of Fairfield, and U. C. Roney, of Corsicana, all of whom are heads of substantial L. P. gas distributing companies.

Since the profit from the operation of underground storage facilities will be largely in the form of benefits to the producing and distributing sections of the industry, and the opportunities for direct profit are limited, it appears that the expansion of the program must be an "inside job". Sources of financing will probably continue to be the producing companies, distributing organizations that are large enough to take care of their individual needs, and local groups of smaller distributors which are able to provide caverns on a joint venture basis.

Doubles Btu in Unit Heater

An effective method has been originated for automatically doubling Btu output in a natural gas unit heater in which output is insufficient when outside temperatures drop below predetermined points.

John S. Adams, chief engineer of the People's Natural Gas Co., Omaha, is author of the method. Mr. Adams

explained his idea in a letter to Brown Instruments Division of Minneapolis-Honeywell Regulator Co. He related how when using a non-indicating controller, firing is switched from natural to propane gas, which has about twice the Btu content of natural gas. In part he wrote:

"In each of these systems, applying to two unit heaters, a single set of components does the job automatically. Each unit heater has two solenoid valves—one for natural gas and one for propane. Both valves may be controlled by the thermostat, although the fuel being used is determined by action of a remote bulb controller.

"A Honeywell remote bulb single-pole, single-throw temperature controller that opens a temperature drop is connected to a snap-acting electrical relay. When the relay is energized, contacts are made so that natural gas valves may be opened and closed at the demand of the room thermostats.

How Valves Operate

"Ordinarily, when temperature is above the set-point of the controller, the relay is energized. The temperature controller bulb is outside the building and when the outside temperature drops below the controller's set-point, the relay is de-energized. The first set of contacts breaks and the second set of contacts is made, energizing a set of solenoid valves in the propane feed line. These valves may also be controlled by the room thermostats."

The snap-acting relay, Mr. Adams explained, makes the change from one fuel to the other very rapidly; it is improbable that the fire will go out, but if it does, safety pilots, supplied with natural gas at all times provide immediate re-ignition. The system is also supplied with necessary safety devices, he said.

This type of system might be used in many ways, possibly to switch from hot water to steam, or from one vat to another. You don't have to start with temperature control. You can use pressure, humidity or level, or almost any primary variable for switching.

LPG Promotional Campaign Starts Eighth Round

"Facts on LP-Gas as a Tractor Fuel," a handout or mailing piece which points up the advantages of propane carburetion for the farmer, and an insert folder on the use of the fuel for clothes drying and chicken brooding are included in "merchan-

There Are Extra Profits In Your Area!

Many industrial natural gas users in your area faced with gas curtailment are a source of hidden profits for you. Hundreds of thousands of domestic users have been added to natural gas systems and now have claim on available gas supplies. Industrial users, therefore, need standby plants more than ever.

If you know of any such problems in your area, inquire into the DRAKETOWN liberal co-operative plan for dealers and distributors.

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PERMASEAL
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PERMASEAL is non-hardening, non-spilling, non-dripping; requires no brush, no stirring, no thinning; it permanently lubricates, therefore a joint may easily be reopened at any time.

May be applied with finger; cleans off with dry rag; has no pigment so leaves no color stain.

Use PERMASEAL for lasting satisfaction and economy; a little goes a long way.

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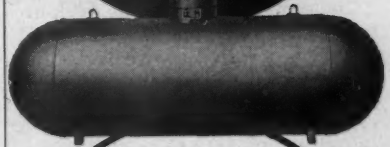
BURNHAM
LPG
TANKS



17 standard systems from 115 to 1,000 gallons — center and end-mount styles. The quality, safety, and service built into these tanks are second to none. Shipped moisture-free. Registered with National Board.

Burnham RADIANT HEATING

Burnham Corporation
TANK DIVISION
IRVINGTON, NEW YORK

dising kits" of local-level advertising and publicity materials sent this month to some 11,000 dealers throughout the country by the National Committee for LP-Gas Promotion.

These and other contents tie in with the eighth round of magazine advertising scheduled for winter insertion in 50 national, regional and state publications by the LP-Gas Information Service, Chicago.

Describing in telegraphic fashion the many features of the fuel contributing to greater operating economy and efficiency, the tractor piece points out that farmers can now buy models factory-engineered for LPG use or have their present equipment converted. "It's Always Fair Weather (both in the home laundry and in the brooder house) with Dependable LP-Gas" is the theme of the insert folder.

Also in the kits were a self-mailer stressing the daily convenience of LP-Gas household appliances in general, with special emphasis on ranges, and proofs of two newspaper ad mats available to dealers—one on gas ranges, the other on clothes dryers and chicken brooders. Members of the National LP-Gas Promotional Program receive a 20% discount on these items. Free radio commercials and a "pattern" press release were included as well.

Lee Brand has been reelected chairman of the committee for the third time.

Service School For Northeast Will Be Held Next Fall

The 5th Eastern Gas Service School, sponsored by LPGA, will be held at the University of Bridgeport, Bridgeport, Conn., next Sept. 9-12, according to George Kelley, Utilities Distributors, Inc., who is chairman of the committee handling the details.

The committee is hard at work arranging the courses, speakers and schedule for this school which is designed for experienced as well as inexperienced service men, providing refresher training for the experienced as well as fundamental training for the newer service men. It's open to any service or installation men in the Northeast.

The cost and complete details will be announced shortly.

Canada's Superior Propane Names New Sales Manager

John F. F. McQueen, president of Superior Propane Ltd., Toronto, Ontario, announces the appointment of Edward C. Prince as sales manager in charge of the company's entire sales organization. The company's activities already embrace the Province of Ontario, and are expanding into neighboring provinces. Superior Propane is a large distributor of propane gas, and one of Canada's largest appliance distributors.

Ted Prince has been in selling and sales management for over 20 years, covering a diversified range of experience. He will have his headquarters at the company's new offices at 26 St. Clair Ave. East, in Toronto.

Richard Enderly, Oil Man, Passes Away In California

Richard C. Enderly, 56, oilman and executive of the Jonathan Club, Los Angeles, died Dec. 15 of a heart attack at his home in Encino, Calif.

Mr. Enderly was vice president of the Wilmington Gasoline Co., president of the Lomita-Signal-Wilmington Associates, president of Freeman & Nelson Oil Co. and a director of the California Natural Gasoline Association.

Alberta, Canada, LPG Firm Sells Control To New Group

Word has been received from Mrs. Amelia P. Johansen, former president of Sturdie Propane Ltd., Lethbridge, Alberta, that the principal shares of that company are now owned by a group of prominent business men of Calgary, Edmonton, and New York City.

This action, taken for personal reasons affecting the shareholders, will not affect the ownership and operation of the company.

The new officers of Sturdie Propane include: Nathan E. Tanner, Calgary, president; A. Bruce McLean, Edmonton, vice president; Lyle Caspell, Calgary, secretary-treasurer; Clifford R. Walker, Calgary. director; Chester A. Asplund, general manager.

Baker's Service Installing Bulk Plant At Moira, N. Y.

A new $25,000 bottle gas bulk filling plant will be constructed by Baker's Service at Moira, N. Z. on a site near the Rutland railroad tracks, it is announced.

Construction of the new plant, which will have a storage capacity of 18,000 gallons, will be started at once and is expected to be completed early in January. Baker's already have a gas bulk plant at Malone Junction.

Clothes Dryer Production Shows Sharp Upward Trend

Gas clothes dryers are expected to deluge the market by next fall. There are a considerable number in the field now. Included are Hamilton, Bendix, Lovell, Temco, and Whirlpool. Both Sears Roebuck and Montgomery Ward are marketing private brands. Four other brands have recently been unveiled—Caloric, Odin, Roper, and Dexter. Three more are due this month—Magic Chef, Norge, and Stiglitz. By late 1953 at least 29 brands are expected to be in the appliance stores.

Last year electric dryers outsold gas dryers by about two to one. The gas industries, both utility and LPG, knowing that goes does a better job, expect to change this ratio rapidly. Each clothes dryer installed represents extra consumption of many gallons of fuel per month. Every one of these units which operates on propane makes it harder for the electrical industry to encroach on the services which should logically be rendered by gas.

UDI Opens 7th Bulk Plant In Ashton, R. I.

Utilities Distributors Inc., with headquarters in Portland, Maine, early in October opened its seventh bulk plant in Ashton, Rhode Island. It will be the distribution center for this company's operations in Rhode Island, Connecticut and southeastern Massachusetts. The plant's capacity is said to be sufficient to meet the needs of 200,000 families in that area.

The plant opening was attended by officials from the state and city, R. H. Mahnke of LPGA in Chicago, and top officials of U. D. I., their customers and friends.

General Gas Corp. To Install Plant At Church Point, La.

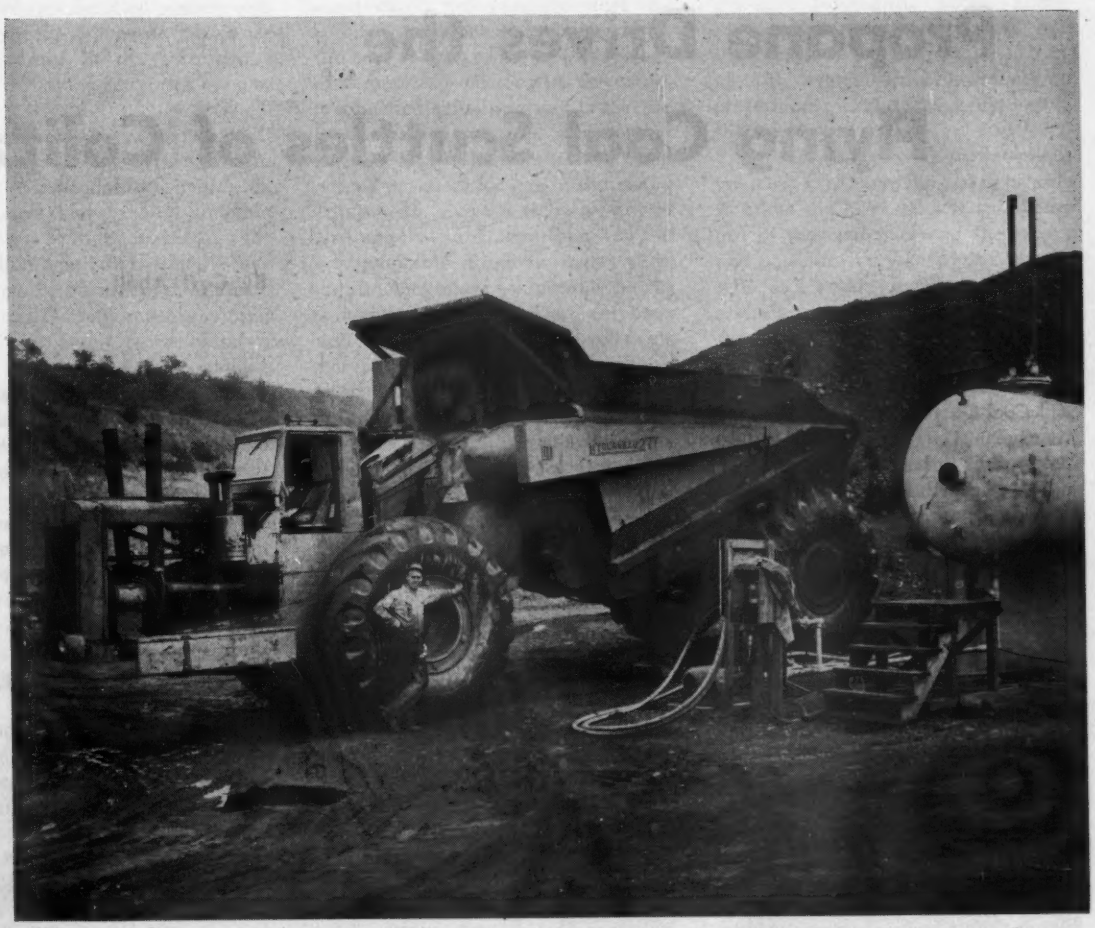
A site has been purchased on the south side of Church Point, La., by General Gas Corp. to build a bulk storage plant for butane, according to Fred Arceneaux, manager of the suboffice in Church Point.

He said the company is awaiting a permit from the Liquefied Petroleum Gas Commission to move a tank from the Crowley area before any further work is done. He also said the company is installing an average of 8 tanks a day in the farming area of Church Point.

Butane-Propane

POWER SECTION

INSTALLATION • CARBURETION • SERVICING



This 60-ton capacity "Tournarocker," burning propane, is one of the largest material-handling vehicles ever built. It is used by the Colitz Coal Co., Inc., Colitz, Pa., in a strip mining operation. The 500-hp., 12-cylinder Allison engine burns 20 gallons per hour. The man standing beside the 30 x 108 in. tire gives an idea of the tremendous size of the vehicle.

Propane Drives the Flying Coal Scuttles of Colitz

By Carl Abell

A visitor approaching the Colitz Coal Co.'s open pit mining operation near Harrisburg, Pa., instinctively pulls in his ears and hunts for cover. From the deep-throated roar that almost forces him back, he assumes that an airplane is taking off from the bowels of the earth, and that it may not be able to clear the crest.

This is no loud speaker version of popping corn, like the noise of a radial engine, but the steady drone of many powerful cylinders firing in line.

Load Looks Like A Monster

A huge pile of coal climbs above the horizon, and under it, charging over the edge of the pit, comes a great steel monster. Its wide-spread wheels, higher than a bedroom door, pick up speed, and a carload of coal roars down the road to the breaker-house on the railroad. Before it is out of sight, its twin, returning empty, lopes easily along. The driver, his eyes 12 feet above the pavement, waves jauntily and returns his hand to the controls and, without bothering to slow down, the great metal beast drops over the horizon and down the slope into the pit.

His interest heightened by the apparitions that have passed, the visitor drives on down the 15% grade into the pit, first making sure that there is room to dodge out of the way in case another load of coal comes booming over the pass.

This is his introduction to the "Tournarocker", the biggest and most powerful piece of material moving machinery in a world of mechanical marvels. The huge bin carries 60 tons of coal per trip. The four huge lug-tread tires, each taller than a man, 30 inches broad, and costing as much as a small automobile, spread out so wide that a 40-foot roadway is required for two of the vehicles to pass. The load, piled high in the bin, towers nearly 20 feet in the air.

Down in the hold, the Tournarocker has stopped beside a 6000-gallon propane tank. A hose is attached to the tank of the iron monster, and the electric pump growls contendedly as it pushes 30 gallons per minute of potential power into the waiting beast. The driver explains that the 250-gallon tank on the vehicle must be filled twice to operate the engine through its 23-hour working day. Twenty gallons per hour—460 per day—go through the engine to make the power and the noise, and move the tremendous loads of coal at the lowest cost per ton that the company has ever accomplished.

30 Miles Per Hour, Loaded

It takes a great deal of horsepower to move such loads up hills, and to carry them 30 miles per hour along the open road. The engine looks insignificant, riding in the short frame that hangs out in space ahead of the wheels. But it develops 500 horsepower in the two rows of cylinders that spread in a neat "Vee" beneath the hood. This is the Le Tourneau Tournapower conversion of the Allison aircraft engine, which flew so many allied planes, and downed so many enemies during World War II.

The supercharger which enabled it to develop 1700 horsepower in the air has been removed, and with new

One of the Colitz Coal Co.'s 60-ton capacity Tournarockers beside a 6000-gal. propane storage tank, and one of the semi-trailer trucks used in same operation.

Big transport trucks like this make it possible for Suburban Gas Service, Inc., to supply propane economically to dealers' bulk plants and to large industrial customers like Colitz Coal Co.

manifolds, changed valve action, an automotive type ignition system, and reduced speed, it does its job easily day after day in the unromantic business of moving coal from mine to rails.

The basic engine is still an aircraft job, built to the high specifications that insure dependability in the air. Its structure had to hold together and continue to function, because the pilot could not pull off beside the road and telephone for help if anything went wrong. Nothing must go wrong. Built with an ample factor of safety for the 1700 horsepower for which it was designed, it originally cost nearly $20,000 to put one of them into a plane. No commercial or industrial engine can be built like this, because the cost would be more than the traffic could bear. With the horsepower reduced to less than one-third of the original output, the durability and dependability of the power plant are little short of amazing.

LeTourneau has wisely equipped these engines to operate on propane. The cost of gasoline for such equipment could not possibly meet the competition of diesel fuel. And since the cost of replacement parts for aircraft engines is necessarily very high, it is particularly important to use the fuel that gives the lowest rate of wear. The use of propane makes the Allison engine practical for use in the heavy equipment, and the light weight of the engine—tons less than that of any available diesel or heavy duty gasoline engine of comparable power—saves carrying dead weight back and forth, at a cost of close to 20 cents per pound per year in this type of operation. It saves hundreds of dollars per year, in dead weight costs alone, to use the lighter engine.

Has Simple Carburetion System

The carburetion system for the engine is relatively simple. Ensign model DG carburetors feed the two conventional manifolds which supply the two banks of cylinders. Ensign Model S regulators reduce the tank pressure to slightly above atmospheric. Filters, shut-off valves, and the necessary pipes and tubing, complete the system—just like we see on an ordinary large truck, only double the number of units.

The drivers love these enormous vehicles. It bolsters the ego to be able to move the largest loads that come out of the coal pits, and the power and noise are very satisfying to men who still retain some of the spirit and vigor that leads younger men to spend their spare time and all their extra cash in developing "hot rods". The company does not object. The results with the men and the machines have been so profitable that they are buying more Tournarockers to replace the big diesel-powered semi-trailers that became obsolete the day the first flying coal-scuttle rolled into the Colitz pit.

Suburban Gas Service 150,000-gal. storage plant at Harrisburg, Pa., which supplies the fuel for the Colitz coal operation.

Hard Starting

● TYPICAL WINTER COMPLAINTS

By Carl Abell

THIS is the season in which complaints of hard starting of propane engines arise most frequently to haunt the service man. The operator is generally sure that the fuel, or the fuel equipment, is responsible for the trouble. Seasoned gasoline engine service men will recognize the close parallel between this situation and the condition that has always existed with gasoline engines.

Owners of gasoline engines have always been inclined to place the blame for hard winter starting on the fuel or the carbuertor, in spite of the fact that for the past 50 years most hard starting complaints have turned out to be on account of electrical troubles. The owner of the propane engine is even more inclined to blame the fuel and the fuel system, because he knows less about them.

Let's analyze the situation first in terms of principles. If the engine is in good condition, and the ignition system is good, and the engine turns over fast enough, and there is a combustible mixture in the intake manifold, the engine is going to start on propane just as it always has on gasoline. No matter which fuel is used, the engine is the same. The ignition system is the same.. The starting motor is the same. The battery is the same. In case any defects in the engine or in the electrical system are the cause of the hard starting, the cure is the same.

You might expect this ancient tractor, more than 25 years old, to give you starting trouble in winter. It does not, because the engine, electrical system, and lube oil are all in good condition, and the carburetor delivers the correct starting mixture.

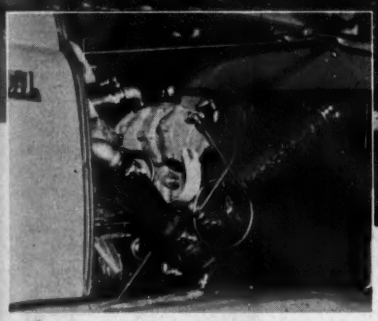
Now let's see what different conditions introduced by the use of propane might have to do with hard starting.

The ignition temperature of propane is a little higher than for gasoline. It takes a little more heat to ignite the charge. It is a little more important to keep the ignition system in good working order with propane than with gasoline, because the gradual loss of efficiency of the ignition system, due to use, will bring in hard starting a little sooner.

The starting motor may turn the engine over more slowly with propane. If the battery has a good charge, but the cranking speed is slow and labored, there are two possible causes—either the starting motor needs reconditioning, or the viscosity of the lubricating oil is too high.

Oil viscosity has a very important bearing on engine starting. When it

Conditions due to age and neglect, which make any engine start hard.



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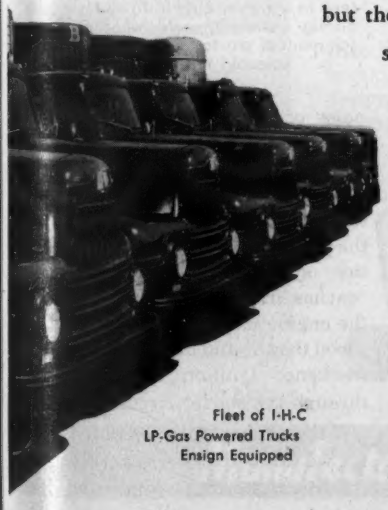
Economy of operation is the principal reason for the swing to LP-Gas as an engine fuel. The new International Harvester Company LP-Gas truck pictured here is powered with an engine designed in every detail for highest efficiency on propane — greatest power, economy and dependability. It isn't likely that I-H-C , after years of laboratory and field tests, would choose anything but the best in carburetion. We are justly proud of their selection of Ensign and shall always do our best to merit this trust.

When *you* choose LP-Gas carburetion for trucks, tractors or buses choose Ensign. You won't go wrong. Ensign is one of the oldest names in carburetion — over 40 years.



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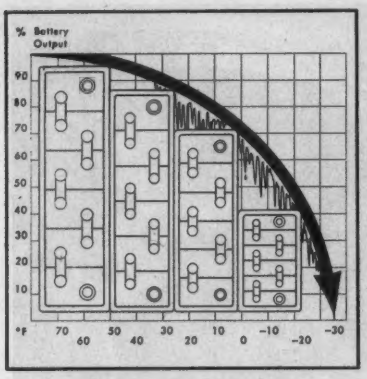
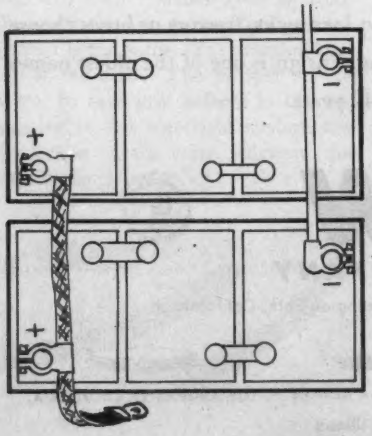


Any storage battery loses power with reduction of temperature. At 0° F. it has half the power that it can deliver at 70° F.

is cold and thick, it exerts a terrific drag. Choking a gasoline engine pulls in a lot of liquid gasoline, which mixes with the oil on the cylinder walls and thins it down so the engine turns over easier. Propane does not thin out the oil, because it is a dry gas. So the starting drag is greater. Because of crankcase dilution, the oil in a gasoline engine gets thinner in cold weather, but in a propane engine, it gets thicker with use, regardless of season. This is because it is not thinned by dilution, and the combined effect of heat and exposure to air in the crankcase causes it to oxidize slowly, which results in increasing viscosity. What can be done about it?

The lubrication practice developed by the early butane carburetion people answers the problem very nicely. For winter operation, use a winter type oil, one SAE grade lighter than would be used in the same engine running on gasoline. If any make-up oil is needed, it should be another SAE grade lighter than the original fill. And if no make-up is needed, it is a good idea to take a quart out of the crankcase now and then, as the starter speed shows that the viscosity is increasing, and thin the oil out a bit by adding a quart of lighter weight.

This is how two 6-volt batteries should be connected in parallel to retain the 6-volt characteristics in the system.



Another factor which makes winter starting difficult is the action of low temperature on the battery. It is only capable of producing about half as much current at 0° F. as it does at 70°. With less power going into the starting motor, and more drag imposed by the cold oil, the time comes when the spark weakens and dies. The ignition system gets only the amount of current that is left after the starter takes the lion's share.

Electrical Systems Need Strengthening

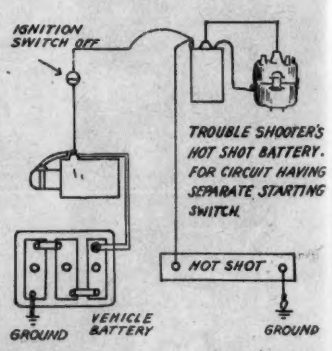
Propane engines which must be used frequently during cold weather should have something done to their electrical systems. A 12-volt system would help. (As this is being written, we have received the announcement that the new Minneapolis-Moline Model UB tractor comes factory equipped with a 12-volt system.) But replacing a 6-volt system with 12-volt equipment is not just a simple problem of putting in a larger battery carrier and a 12-volt battery. The rest of the electrical system was designed for 6 volts.

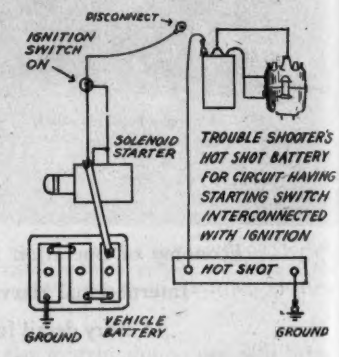
The simpler solution is to install a second 6-volt battery, connected up *in parallel* with the original battery. This doubles the amperage, or power, but the voltage remains the same, and the electrical system will stand the strain. The new battery is also kept charged automatically as long as the tractor is given enough use to generate the necessary current.

One of the most helpful accessories for getting engines started in cold weather is a "helper" battery which may be quickly connected into the ignition system. This may be hooked up in one of two ways, depending on whether the engine is equipped with a manually operated or a solenoid type of starter switch. The two circuits are shown in accompanying cuts.

These illustrations show a trouble-shooter's "hot-shot" battery, which is most convenient for carrying on field service calls. This is the dry cell arrangement which was universally used years ago to operate outboard motors. They are now used in radio servicing, and are generally obtainable at auto parts and radio parts stores.

Automobile batteries are frequently used for this "helper" job, particularly in service shops. Results are generally better if they are connected up according to the diagrams in Figs. 1 and 2, instead of paralleling to the





Circuits for connecting "helper" battery in ignition circuit to aid starting during extremely cold weather. Top, for manual starter switch, bottom, for solenoid starter switch.

poles of the tractor battery, on account of the difficulty of securing a broad enough contact to deliver the full current of the battery through the starter. With the full strength of the second battery going to the ignition system, a really hot spark reaches the plugs, and this enables the engine to start at lower cranking speed than would be possible with the weakened ignition current coming through the starter circuit.

If the engine still does not start after we know that the general engine condition, starting speed, and igni-

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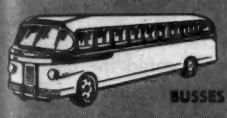
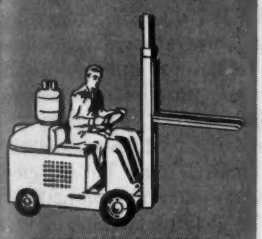
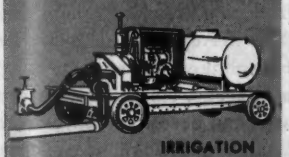


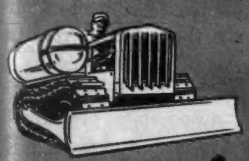
BUSSES



MATERIALS HANDLING



IRRIGATION



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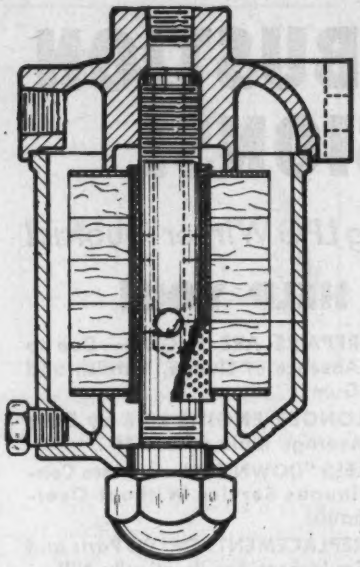


A typical propane liquid filter, with clean-out plug on side near bottom. In some makes, the plug is at the bottom.

tion strength are all good, we have a rather good indication that there is trouble in the fuel system. The mixture in the manifold may be too rich or too lean to burn, or there may be no fuel at all.

The quickest way to find out if the engine is getting fuel is to check the secondary regulator to see if it is opening. If the regulator has a manual or an electrically operated priming plunger, operate it, and listen for the hiss which indicates the escape of fuel. As soon as the hiss is heard, release the plunger to avoid producing an over-rich mixture. (The "Algas" electrically primed regulator does not have a projecting plunger that can be operated by hand. The test may be made by blowing into the regulator breather hole by means of a soft rubber tube.)

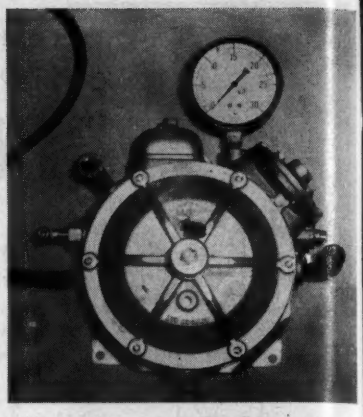
If a regulator responds to the manual test, but not to the operation of the switch, it indicates a defective solenoid circuit. This may be further verified by listening for the click which should be audible in the solenoid as the ignition switch is turned on and off.

The functioning of all types of regulators not equipped with manual or electrical primers may be checked by blowing into the breather hole, as indicated above. If there is no fuel coming through, it indicates a stoppage in the fuel system, a closed valve at the tank, or an empty tank. If there is fuel in the tank and the valve is open, the point of stoppage may be quickly isolated by opening the drain port of the fuel filter. (Close the valve at the tank first.)

If a strong flow of clean fuel comes through the filter drain, the stoppage is in the regulator—probably at the primary valve. If no fuel comes out of the filter, or only a feeble flow appears, either the filter is clogged or there is a restriction or crimp in the fuel line between the filter and the tank. If no damaged spots in the fuel line are readily apparent, the bowl should be taken off the filter, and the element cleaned.

Choking May Cause Flooding

With fuel coming through the regulator, the next step is to get a combustible mixture. The fuel mixture must be within certain limits of fuel to air, or it will not burn. These limits are closer together with propane than they are with gasoline. It is very easy to "flood" the propane engine by using the choke too long. With a balky



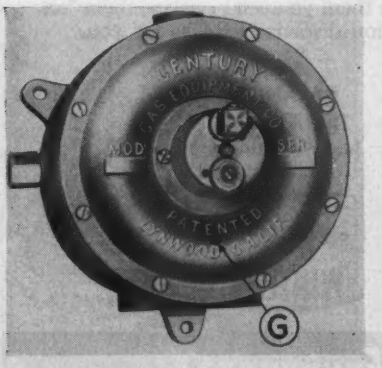
All regulators but the Century have test ports for the connection of a gauge to test the operating pressure following the first stage of reduction. The gauge hole will be sealed by a ¼" or a ⅛" plug.

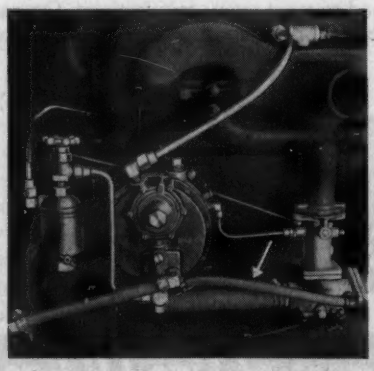
engine, the temptation to keep on choking it is very strong. But we should bear in mind the basic difference between propane and gasoline. Propane comes to the carburetor completely vaporized, regardless of engine temperature. Gasoline comes to the carburetor as a liquid, and in a cold engine, only a small percentage of it will produce vapor.

The portion which vaporizes—the "light ends," must be sufficient in volume to make a combustible mixture. To get this amount of vaporizable gasoline, we must use the choke and draw in a great deal more gasoline than the engine can burn. The liquid gasoline which remains is just excess baggage. As the engine heat increases, the percentage of gasoline which will vaporize and become combustible increases, so we must gradually return the choke button to the dash to keep from having an over-rich mixture. (The automatic choke on your automobile performs this function without attention.)

No propane engine requires choking as we think of it in connection with gasoline. When the fuel tube between the regulator and the carburetor is full of gas, and all the air which crept in while the engine was stopped has been pushed out, the mixture coming to the carburetor is just as combustible as it will ever be.

The only purpose of the "choke" on a propane regulator, whether it is operated by hand or electrically, is to release enough fuel through the regulator to clear the fuel tube and fill it with gas. No richer mixture is ever





All regulators have balance holes, either open directly to atmosphere (left, G) or connected by a tube to the carburetor air intake (right, arrow).

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required, even in the coldest weather. One quick touch of the choke is all that is necessary.

The Ensign carburetion system offers an apparent exception to the above statement. Most models of Ensign carburetors are equipped with a separate starting device, which is brought into operation by pulling a choke button, and leaving it out until after the engine has started and is firing regularly. Pulling this choke button not only opens the starting device, which is in itself a miniature carburetor, but it also closes a butterfly in the air horn, to close off the main carburetor.

The engine will start and idle on the starting circuit, but the latter is not large enough to provide operating power. The choke button should be pushed down quickly—not gradually—to switch operation to the main carburetor and produce operating power. The idling circuit lever on the carburetor, and the butterfly in the air horn, must be interconnected so when one is completely open, the other is completely closed. If this adjustment is not correct, it will be difficult to start the engine, and it may show other operating defects. The throttle should be from one-fourth to one-half open for starting.

With the Ensign carburetion system, there is no mechanical means provided to release fuel from the regulator to the carburetor. It is seldom required, but it can be done, if necessary, by blowing into the balance hole on the regulator.

Algas, Century, Dix, and National carburetion systems are provided with either manually or electrically operated plungers which open the secondary regulator valves to release extra fuel for starting. Their operation can be very easily checked by listening with the ear close to the regulator. When the plunger is actuated, there should be a slight audible hiss. Again we caution against the over-use of these devices. As soon as the fuel tube is full of fresh fuel, the "choke" has accomplished its full purpose, and any more choking is likely to result in producing mixtures which are too rich to start.

How to Check Primer

The electrically operated primers of any of these makes may become inoperative, due to the ordinary causes which affect electric circuits. If they fail to operate in response to the switch, the engine will start hard due to the lack of priming. The operation of the primer may be checked by turning the ignition switch on and off, and listening for the metallic click which accompanies the movement of the plunger. If it is not heard, it indicates failure of the electrical circuit. With Century and Dix systems, the carburetor may be primed by hand, by pressing the plunger which projects through the solenoid, which is mounted on the center of the regulator body. With the Algas installations, the same affect may be secured by blowing into the breather hole on the regulator cover.

Climax, Garretson, Hughes, J & S, and A. O. Smith carburetors, which may be frequently encountered as the result of independent field conversions, are generally installed by "spudding in" to the regular gasoline carburetor. With these jobs, the regular choke is used, if needed. Two or three turns of the crankshaft is all the time required for complete chok-

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ing, and then the choke button should be returned to the "off" position. As soon as the mixture is rich enough to fire, it is rich enough to run.

Beam, Cyclone, and Roadmaster carburetors have no means of priming the fuel tube from the regulator. The customary installation with these makes is by means of an adaptor ring, which is placed between the carburetor air-horn and the air filter. Unless they are installed with a spud in to the throat of the gasoline carburetor, pulling the choke would make it impossible to start.

All three of these carburetion systems have what is called a "leaker type regulator." The secondary regulator spring is set with just enough tension so the valve leaks and provides the right amount of fuel for idling. To prevent leaking when the engine is not running, an electric lock-off valve is installed in the fuel line, interconnected with the ignition circuit in such a way that when the ignition is turned off, the fuel is also turned off. Since the fuel starts to flow into the carbuertor supply tube as soon as the ignition is turned on, no choking is necessary—just turn the switch and wait a moment—not too long.

With any make of L. P. gas carburetor, the final regulator has a "balance hole," which is either open direct to outside atmosphere, or connected through a balance tube to the carburetor air inlet. These tubes occasionally get struck or bent in such a way that they become closed, or if no balance tube is used, the direct-to-atmosphere vent hole may become plugged with dirt. Anything that interferes with normal breathing through these vents will induce hard starting, and will interfere with engine operation. (Certain manufacturers have discontinued threading these breather holes, so uninformed operators will not put pipe plugs in them to prevent entrance of dirt.

One of the essentials of preventive maintenance with the LPG fuel system is to keep the regulator breather hole from becoming restricted or closed. The operator will probably never remember to check it, so it is good practice for the service man to see that it is clean before making any other checks.

Appearance of frost on a regulator of an engine that has been standing is evidence of a leak, and if the fuel is escaping through the final regulator valve, the mixture is probably too rich to burn, so it will be difficult or impossible to start the engine until the fuel is put under control. Incidentally, a leak in the fuel system calls for extreme care with sources of ignition. No attempt should be made to start the engine until the leak is stopped.

Such a leak will sometimes be caused by a small piece of dirt, rust, or copper tube scale, which lodges between the edge of the orifice and the valve seat in the regulator. If this obstruction is not bedded into the plastic seat, it may sometimes be blown off by opening the regulator valves with the primer, or by blowing into the regulator balance hole. (A soft rubber tube should be carried in the tool kit for this purpose).

Wash the seat with the strongest possible flow of gas that can be produced in this way. The gas tube should be slipped off at the carbur-

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etor end, to avoid filling the manifold with pure gas, as this would only make it harder to start the engine later. If this does not remove the dirt and stop the flow of fuel, then the regulator must be opened and the seat replaced.

Complete stoppage of the fuel will make it impossible to start the engine, while partial stoppage may permit starting, but will prevent normal power operation. These conditions are diagnosed by installing a low-reading pressure gauge (0-15 or 0-30 lb.) in the connection provided for that purpose in the regulator housing. This enables us to read the pressure existing in the expansion chamber between the first stage and the second stage. This should fall within a certain range, which varies with different makes, as shown in Table 1. The reading should not only be within the prescribed limits—it should remain constant after the flow is established. The reasons for this will be apparent when one considers that the pressure in the regulator corresponds to the pressure at the outlet of the fuel pump in the gasoline system.

A reading which is higher than normal indicates either a leaking first stage regulator valve, a mis-adjusted regulator, or the remote possibility that the first stage valve spring is of the wrong calibration or has weakened in service. A low reading, with the engine not running, shows a stoppage of fuel. This might occur from an empty tank—it has happened—or closed tank valves, flattened fuel line, clogged fuel filter, or the closing of the excess flow check valve in the tank by opening the liquid outlet valve too fast when a high pressure differential existed between the tank and the fuel line.

The cure for empty tanks and closed valves is self-evident. When a fuel line becomes flattened or crimped, it should be replaced, or repaired by cutting out the damaged portion and replacing it with a section of good tubing. Flared fittings should be used to join the old and new sections, instead of attempting to solder the ends together. Solder may be perfect today, but crystallized and broken tomorrow.

Fuel filters sometimes become completely clogged with black, finely divided, scaly material. This happens more often in the first few months of service of a new unit than in the later period, and is a more frequent happening with tractors or vehicles which are used on rough terrain, where the pitching around keeps the fuel in the tank agitated.

It is inevitable that some corrosion should occur inside the tank, following the required hydrostatic test, in which the tank is filled with water and subjected to high hydraulic pressure to be sure that it does not leak. Most tank manufacturers now try to minimize this trouble by internal dehydration with heated air, but even then some corrosion occurs before the tank is filled with fuel. This rust is the principal ingredient found in the filters.

After the tank is filled with fuel, corrosion becomes negligible, and after the preliminary rust is carried out with the fuel, there is seldom enough formed to cause trouble.

The fuel filter has a drain plug or cock near the bottom of the bowl, through which the accumulated impurities may be blown out. Recommended procedure is to close the fuel

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TABLE 1.

Correct Regulator Pressures Following Primary Reduction, For Various LPG Carburetion Systems.

Make	Model or Series	Pressure, psi
Algas	1500	6 to 8
Algas	940	3 to 4½
Algas	1083	3½ to 5
Algas	1200	2 to 3½
Beam	400	4 to 5
Century	M and K	No test port
Climax	all	15
Cyclone	all	8
Dix		2 to 4
Ensign	W, R, and S (without oil control)	4
Ensign	W, R, and S (with oil control, engine dead)	1
Ensign	W, R, and S (with oil control, engine running)	10
Ensign	M and HD	8 to 10
Garretson	up to 75 hp. engine	7 to 10
Garretson	75 to 100 hp. engine	10 to 12
Garretson	100 to 125 hp. engine	12 to 16
J & S	1 psi for each 40 cu. in. of engine displacement	
Marvel-Schebler	(Formerly Roadmaster)	3 to 4
National	100	3
National	all other	5
Powermaker	Frundell	¾
Roadmaster	UT-C-600	3 to 4
A. O. Smith	(Formerly Hughes)	5

valves at the tank, open the drain, and allow the fuel in the line to blow the sediment out.

Occasionally a filter will be packed so tight that the line pressure will not clean it, in which case it is necessary to remove the bowl, and clean the filter element by hand. As is customary with gasoline filters, a new gasket should be installed between the bowl and the filter body.

Whenever any joint in the fuel system is opened and put back together, it should be tested to make sure that there are no leaks. DO NOT USE A MATCH OR OPEN FLAME TO MAKE THIS TEST. The proper—and safe—way is to flood the joint with soapy water, and watch for the appearance of bubbles. One of these

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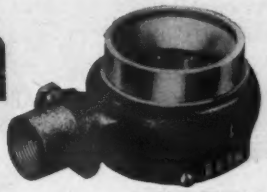
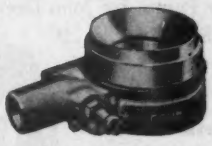


2" Carburetor Adapter



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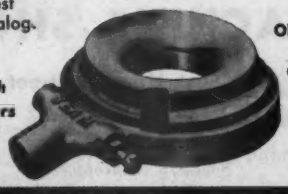

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soapy water testing kits—a jar of the solution and a brush—should be a part of the working kit of every field service man.

One of the most frequent causes of lack of fuel at the carburetor is the closing of the excess flow check valve, which is located inside the tank back of the liquid outlet valve. Its purpose is to shut off the flow of fuel automatically if any damage should occur that would allow fuel to escape through the fuel line at an abnormal rate. Opening the liquid fuel valve too quickly when the pressure is high in the tank, but low in the fuel line and regulator, causes this excess flow check valve to snap shut. It may be opened by closing the liquid fuel valve, then striking the tank (never the valve) a sharp blow with a mallet, stick, hammer, or some other heavy object. The plunger of the excess flow valve will fall open with an audible click.

Normal fuel flow through the line may then be obtained by opening the liquid fuel valve just a crack, and waiting a minute for the pressure to equalize in the line, after which the valve may be opened as rapidly as the operator desires. All owners should be instructed in the correct way to open the fuel valve, and in the procedure of opening the excess flow valve in case it should ever shut off the fuel supply.

These are the causes of nearly all of the hard starting complaints which will be encountered in the operation of propane engines, in either winter or summer. They can be boiled down to the same principles which have always governed the starting of gasoline engines—see that the engine is in good condition; see that the ignition system is functioning properly; see that the cranking speed is normal; see that there is fuel in the carburetor, and that the mixture is neither too rich nor too lean. And nine-tenths of the hard starting complaints will be found to originate in the electrical system.

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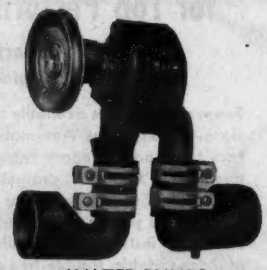

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Industrial Engine Men May Adopt Aircraft Design

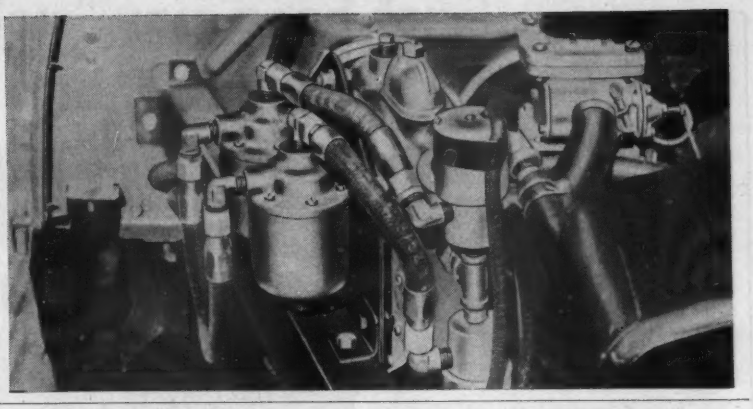
The use of the altered Allison aircraft engine in heavy duty equipment such as the Tournarocker, and in stationary applications running sawmills, pumping irrigation water, and other jobs requiring high power and extreme durability, is being watched with interest by engine designers and users of large industrial engines.

These engines have been available through surplus property sources, at a small fraction of their original cost. This makes it feasible to use the power plant in operations such as are mentioned above without the heavy cost penalty that would be associated with the development of a special, new, lightweight engine for that specific purpose.

From a careful study of the operating results and costs, engineers may form a new conception of how far it is practical to go in approaching aircraft engine design practice in the production of new engines designed specifically for industrial use. The situation is well worth following. There is a definite need for a practical lightweight 500-hp. engine for mobile service. Experience with the revised Allison may lead to the development of greatly improved industrial engines of lower weight and smaller size than those which can now be obtained in this power range. It may be possible with propane, even though not yet economically practical with either diesel or gasoline.—Editor.

Two Tanks, Shut-Off Valves Solve Truck Fuel Problem

Cab-over-engine trucks, in which the space for fuel tanks is severely limited by the general design of the trucks, present quite a problem when the operator requires large fuel capacity. This has been answered in a very practical manner in a recent L. P. gas installation on a Diamond-T truck by the installation of two short 55-gal. tanks on opposite sides of the frame.



At right: "Algas" carburetion installation on Diamond-T cab-over-engine truck, showing solenoid valves which permit drawing fuel from one tank at a time, and prevent transfer of fuel between the two tanks.

Of special interest is the method of preventing the transfer of fuel from one tank to the other in response to differences in temperature between the two tanks. Separate fuel lines are run to two solenoid shut-off valves located at the regulator. These are connected to a toggle switch located on the dash, in such a manner that fuel is withdrawn from only one tank at a time, and the two tanks are never inter-connected. This prevents any hazard from overfilling one tank due to the flow of fuel from the warm side to the cool side of the truck.

Separate Fuel Filters Used

Separate fuel filters are installed on the two fuel lines, and these, with the regulator and the two solenoid valves, are compactly mounted on a bracket beside the engine.

Fuel units are "Algas," and the installation was engineered jointly by American Liquid Gas Corp. and the Diamond-T Truck Corp. This installation is officially approved by both the Diamond-T Truck Corp. and Continental Motors Corp., manufacturer of the engine used in the truck.

Suburban Propane Enters Marine Distribution Field

Suburban Propane Gas Corporation of Whippany, N. J. has entered the marine field with a new subsidiary, the Suburban Marine Gas Company. This was announced today by Mark Anton, Suburban Propane president.

The new company, Mr. Anton reported, is assuming the liquefied petroleum gas distribution business of

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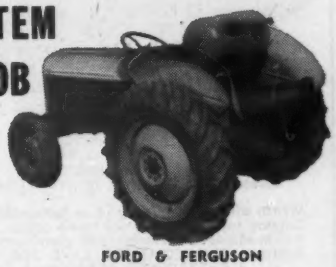

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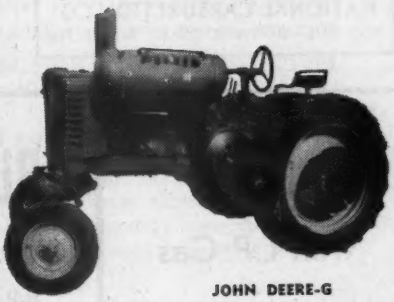

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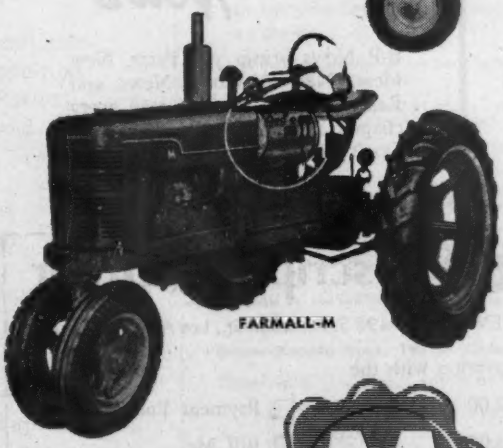

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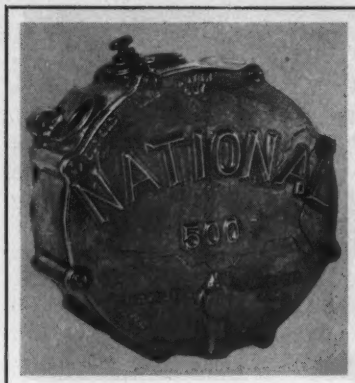

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the E. J. Willis Co., marine suppliers, 91 Chambers St., New Yok City. The Willis company formerly was supplied its gas by Suburban Propane and marketed gas under the trade name of Blu-Flame Gas Service.

Suburban has purchased Willis' gas equipment inventory in Willis' New York warehouse. Mr. Anton stated that Suburban's plan to market gas in the marine field differs from the former Willis plan in that Suburban will sell cylinders through its dealer organization to boat owners whereas Willis distributed the equipment on a deposit basis.

Suburban's marketing area for gas for marine use, Mr. Anton stated, will extend from Maine to Florida, adding that Suburban's 63 bulk plants in the East will provide gas for the marine operation. He also stated that Suburban's plan calls for ready availability of gas to boat owners by locating distribution points at boat yards and boat basins.

Kansas Gas Dealers Buy Implement Business

Dwight Copple and Lowell Lytle, L. P. gas operators at Coldwater, Kan., have purchased the John Deere implement business in Coldwater from Wilford Betzer.

They will continue to operate the gas business in connection with the John Deere dealership.

Copple and Lytle recently sold their service station business.

Smith Center Gas Co. Installs Two Bulk Plants In Kansas

Newest business in Smith Center, Kan., is the Smith Center Gas Co., which has installed two bulk tanks a half mile west of the city on the new US-36 highway. Jim Vander Giesen, who owns another propane-butane plant at Downs, Kan., is making the installation.

The business will be managed by Bernal DeBey, now a resident of Downs. He will live in Smith Center.

A new delivery truck is being used at the Smith Center plant. For the present, calls for service are being handled through Ayres Bros.

The Smith Center propane-butane plant is being operated in connection with the Downs establishment. When steel shortage is relieved, the plans are to make the Smith Center plant an 18,000-gallon storage unit. The Downs plant has storage for 24,000 gallons.

Both plants are franchised "Phil-gas" distributors for Smith and Osborne counties.

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6. Regulating Gas Pressure and Temperature
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10. Checking the Engine's Condition
11. Raising the Compression Ratio
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14. Tractor Conversions
15. Truck and Bus Conversions
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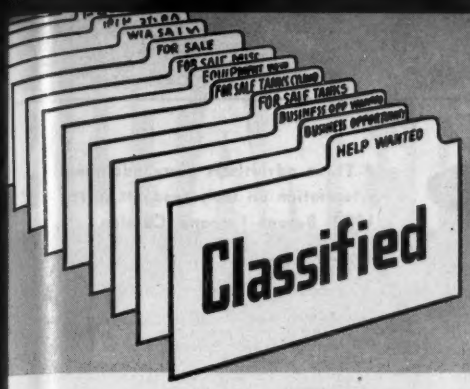

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SALESMEN NOW CONTACTING L.P. gas distributors, cylinder and tank manufacturers to handle major line of equipment by a leading manufacturer. A number of good territories are still open. Write Box 900, BUTANE-PROPANE News, 198 So. Alvarado, Los Angeles, Calif.

BUSINESS OPPORTUNITIES WANTED

WANT TO RETIRE—NEED HELP? WILL PURCHASE 50% TO 100% SHARE IN LPG BULK PLANT. 43, MARRIED, FAMILY, 10 YEARS EXPERIENCE WHOLESALE AND RETAIL, COLLEGE, REFERENCES. WILL RELOCATE IN U.S.A. P.O. BOX 528, MONTICELLO, N. Y. TEL. 655.

WANTED TO BUY—PRIVATELY OWNED bottled gas plant. 500 to 2000 customers in Ohio or Pa., Indiana, Kentucky. Give all information possible. Write Box 333, Barnesville, Ohio.

BUSINESS OPPORTUNITIES OFFERED

INDIVIDUAL OWNER OF NEW, SIMPLE Propane Carburetion System wishes contact with reliable manufacturing concern, regarding volume production and distribution. This system has been field tested on hundreds of pieces of equipment, during past two years. Proven higher efficiency rating, lower manufacturing costs. Patent protecion. Write Box 100, BUTANE-PROPANE News, 198 So. Alvarado, Los Angeles, Calif.

FOR SALE — TRUCKS & TRAILERS

FOR SALE—ONE U69 DALWORTH TWIN Barrel Semi-trailer. Each Barrel 46" x 298", 1965 water gallons. Shell .408—Head .266, purchased 1951. Salmon Butane Gas & Appliance Company, Summerville, Georgia.

AT LAST—REPLACE THAT WORN-OUT bobtail engine with a new Reo LPG powered replacement engine. A complete 142 HP Reo LPG replacement kit can be supplied for any make truck or tractor. Call, Write or Wire—Nor-Tex Products Company, Box 775, Denton, Texas.

1951 INT. 1 TON, 750 x 16, 8 PLY DUAL rear tires, 25,000 miles, 16 mo. old, with BRAND NEW 600 W.G. single propane tank, 250 lb. W.P., Price for tank & truck, $1,995.00. Add for new pump, piping, hose, propane carb. $400.00. White River Distributors, Batesville, Ark.

THIS IS IT! A NEW 1953 F-20B REO GOLD Comet chassis, 8:25 rear, 7:50 on front, completely equipped with 1250 WG Nor-Tex twin propane tanks, skirted, plumbed, fuel tank, KK190 Viking pump (with mechanical seal) 50' filler hose, excise tax paid, ICC lights. Power Take-off with Spline Jack Shaft, Aluminum paint over red oxide. Ready to go with prices starting at the low price of $3950.00 F.O.B. Denton. Meter, LPG carburetion, etc., extra at reasonable prices. Why don't you write—wire or phone today. Nor-Tex Products Company, National Sales Agents for North Texas Tank Co., Phone Central 5416, Denton, Texas.

1951 INT. 1½ TON, L-150, 750 x 20 TIRES, 31,000 miles, with BRAND NEW 1000 W.G. single propane tank, 250 lb. W.P., Price for truck and tank, $2,195.00. Add for new pump, piping, hose, propane carb, $400.00. White River Distributors, Batesville, Ark.

FOR SALE—TRUCKS & TRAILERS-Cont.

1951 INT. 2 TON, 2 SPEED AXLE, 28,000 miles, 18 mo. old with 1400 W.G. twin propane tank, 250 lb. W.P., Roper pump, Pittsburgh reset non-printer meter, Ensign carburetion, heater, hose, piped complete, NEW COST, $4,925.00, OUR PRICE $3,495.00. White River Distributors, Inc., Batesville, Ark.

1951 INT. 2 TON, 2 SPEED AXLE, 36,000 miles, 16 mo. old with 1500 W.G. twin propane tank, 250 lb. W.P., Smith TC-2 pump, Pittsburgh meter, Ensign carburetion, heater, hose, piped complete. NEW COST $4,985.00. OUR PRICE $3,495.00. White River Distributors, Batesville, Ark.

READY FOR WINTER? IMMEDIATE DElivery—New 1952 2 ton, 2 speed Chevrolet with Twin 1250 WG propane tanks equipped with new mechanical seal Corken 50 GPM pump, fuel tank, filler hose, Pittsburgh reset meter, Hannay hose reel, 20# fire extinguisher, white enamel. Federal tax paid—$4484.10 F.O.B. Denton, Texas. Nor-Tex Products Company, Box 775, Denton, Texas.

PROPANE DELIVERY TRUCKS, IMMEdiate delivery, your choice of twin or single tanks, 600 to 2,000 gal. mounted your truck or we furnish any make or size truck at BIG SAVINGS. We pipe to your specifications and furnish everything ready to deliver gas. We save you up to $1,000.00 on each unit. See us before you buy. Over 75 trucks sold by us in every State and Canada. White River Distributors, Batesville, Ark.

FOR SALE—PROPANE SINGLE TANK delivery truck. 1057 gal. Delta tank, 200-lb. working pressure—mounted on 1950 Dodge two-ton truck—2 speed rear axle—19,000 actual miles —new hoses. Pittsburgh print meter, 8.25 tires. See truck at 1423 N. 4th, Arkansas City, Kansas, Phone 1470.

FOR SALE — TANKS & CYLINDERS

FOR SALE—USED TANKS AND CYLINDers. 70—100# cylinders—24 gallons net. 220—50 gallon size— verticles—semi spherical—horizontal. Some other sizes—All high pressure and meet codes. Inquire: 257 Race Street, San Jose 26, Calif.

FOR SALE—2—USED 1000 GALLON 125# w.p. truck tanks, with skirting, ready to mount. 48" diameter. Mfg. by National Butane Gas Co., Memphis, Tennessee. $350.00 each. Graeber Bros., Inc., Marks, Miss.

52 LB. CAPACITY PROPANE CYLINDERS ICC 26-300., Tare weight 125 lbs. A good strong cylindner for long life and rough service. Priced to sell. Pittsburgh Thermoline Co., 14 South 19th Street, Pittsburgh 3, Penna.

CYLINDERS ICC, 4B240. BRAND NEW. 100 lbs. capacity, TW 70 lbs. $13.95, valve extra. Also 20 lb. capacity with Rego valve complete, $9.45. Lower prices for large quantity orders. A complete stock of regulators and fittings for immediate shipment. F. O. B. Cleveland, Ohio. Home Gas Equipment Co., 1301 Carnegie Ave., Cleveland 15, Ohio.

AT DEPRECIATED PRICE, 1400—60#—4B240 Pressed Steel Tank Company cylinders. City Gas Service, Inc., Wisconsin Rapids, Wisconsin.

FOR SALE—TANKS & CYLINDERS-Cont.

USED BUTANE TANKS—ICC 70 CAPAcity 60 lbs. with P.O.L. valve, diameter 12"—height 37". All in good condition, only 85 available at $5.75 each. Home Gas Equipment, 1301 Carnegie Ave., Cleveland 15, Ohio.

EQUIPMENT WANTED

WANTED FOR EXPORT—6 LOW PRESsure, 8 high pressure 10,000 to 30,000 gal. cap. storage tanks. Lestan Corp., Rosemont, Pa.

FOR SALE MISCELLANEOUS

GALVANIZED HOOD, STAND, AND BASE to protect your two cylinder installation; $5.45 each. Packed 10 to a carton. Also Rego or Fisher 2-cylinder regulator, T Block, and 2 pigtails at $4.65 each. Sold on satisfaction or money refunded. Home Gas Equipment Co., 1301 Carnegie Avenue, Cleveland, Ohio.

COPPER TUBING—⅜" OD X .032 WALL —50 ft. coils, lots of 10 or more $4.95 per coil. Less than 10 ad 50c per coil. Freight prepaid on 20 or more coils. Home Gas Equipment Co., 1301 Carnegie Ave., Cleveland, Ohio.

ALUMINUM CYLINDER PAINT. EXTRA heavy body, long lasting, 10 minute drying, for spray or brushing. List price $4.30 per gallon. Your Cost $2.85 per gallon. Freight prepaid in lots of 20 gallons or more. Finest quality paint you can buy for bulk tanks or cylinders. Home Gas Equipment Co., 1301 Carnegie Ave., Cleveland 15, Ohio.

NEED A TRUCK PUMP? NEW KK124 VIKing $70.40 exchange for your old Viking. New Fairbanks-Morse platform scales w/automatic shut-off for cylinder filling. $94.76 f.o.b. Nor-Tex Products Company, Box 775, Denton, Texas.

"STOP THAT LEAK". ITS EASY TO FIND with Leak Detecto Brush. $3.75 ea. Quantity discounts. Solution, 5-gal. $7.50. 1-gal. $1.75. Gas Appliance Stores, Inc. Box 5057, Columbia, S. C.

FOR SALE—IMMEDIATE DELIVERY! Eureka Smokehouse Burner Assemblies! For meat smoke houses using bottled gas. Completely automatic. Clean filtered smoke. Distributes heat uniformly. Low gas consumption. Automatic temperature and pilot control. Less product shrinkage. Easily installed. Write for descriptive pamphlet. Eureka Equipment Company, P. O. Box 396, Beloit, Wisconsin.

FOR SALE—FAMOUS BAKER ALCOHOL pumps for injecting alcohol into propane-butane cylinders. Used by leading gas distributors for eliminating moisture trouble. Send $39.95 for pump complete with fittings. Baker Engineering, Malone, N.Y.

PROFESSIONAL SERVICES

LET MY LP EXPERIENCE WITH OVER 100 operating properties increase your profits. Floyd F. Campbell, Management and Sales Consultant, 1495 Forest View Drive, St. Louis 22, Missouri.

BUILDING A BULK PLANT? LET US serve you as we have so many others. H. Emerson Thomas and Associates, Westfield, N. J., Telephone 2-2800.

PAUL SAYS...

"Southwest pays the freight on most items."

WE GUARANTEE all equipment advertised to be new unless otherwise specified. Pictures and literature on request. WE TRADE. WE FINANCE.

1949—Chevrolet 2 ton, 2 speed, 825 tires, red paint, new equipment includes 1370 twin U69-250# W. P., P.T.O. pump, piping, 50 ft. ¾ hose, ICC lights & reflectors, Fed. tax included. Immediate delivery.....$2663.00
20# Fyr-Fyter Dry Chemical Extinguisher .....$ 65.75

*Beam Carburetion 400 Regulator.....$ 48.65

15 DAY FREE TRIAL Alcohol Injector, use with or without truck pump. Prepaid 2 qt. $27.95 — 4 qt. $29.95. Write for literature.

*Beam Electric L. P. Gas Solenoid....$ 10.15

1951—F6 Ford 2 ton, 2 speed, 825 tires, heater, low mileage, new equipment includes 1430 twin U69 - 250 W.P., pump, P.T.O., piping 50 ft. hose, ICC lights and reflectors, Fed tax included. Immediate delivery, a real value $3238.00
50 ft. ½" vapor hose fitted add.....$ 37.00

*Beam Electric Solenoid.....$ 8.75

Climax Carburetion vapor gasoline kit includes regulator hose, champ, load adjusting, high pressure hose with P.O.L. fitting. Retail $37.50, Dealers 1 - 4 $18.75, 5 or more $14.05.

Climax Vaporizers—Fits all vapor systems such as Garretson, J & S, Algas, etc. Simplest and most compact unit on the market. Retail $17.50, Dealers 1 - 4 $8.75, 5 or more $6.50.

*Carburetor adapter Olds & Cads 1952 $17.50

1430 twin delivery truck tanks, U69 - 1950 code 250 W.P. complete with tank fittings, prime painted, plain skirting with tool box built in. These tanks can be shipped by truck or rail. Save by doing your own installing. Immediate delivery $1250.00
Built in custom fuel tank add.....$ 62.50

*Dix Carburetion Vaporizer & Mixer $ 52.50

1951—Chevrolet 2 ton, 2 speed, 825 tires, new equipment includes 1430 W.G. twin tanks U69 - 250 W.P., P.T.O. pump, piping, 50 ft. ¾ hose, ICC lights and reflectors, Fed. tax included. Immediate delivery $3338.00
Combination Carburetion installed add.....$ 110.00

*Viking Pump KK 190 w/mechanical seal $106.70

1952 Chevrolet, Ford or G.M.C. 2 ton, 825x20 rear tires, 1370 W.G. twin or single tank U69 - 250 W.P. 1950 code with pump, P.T.O. piping, 50 ft. ¾ hose, ICC lights and reflectors, Fed. tax included.....$3895.00
Pittsburgh "760" meter installed with back check and differential valve add.....$ 336.50

Custom Fuel Tank for most all popular cars .....$ 59.89

*FOR COLD MORNING STARTING USE THE FREEMAN ENGINE HEAD BOLT HEATER. Replacing a head bolt, it extends a 650 watt heating element directly into the water jacket. Simple to install, you can make a profit on the installation.
Dealers wanted retail $11.85. Dealers cost $8.04.

*Remote L.P.G. fuel tank gauge for car dash mounting .....$ 15.00
*Cold Manifold for all cars.....$ 40.00
*Roper 2 A Pump.....$ 96.75
*Rockwell 760 meter small reset.....$285.00

*Denotes items that are freight prepaid if check is sent with order, or if credit has been approved.

Paul L. Maxwell
SOUTHWEST GAS EQUIPMENT CO.
Liberal, Kansas

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